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COMPUTERWORLD

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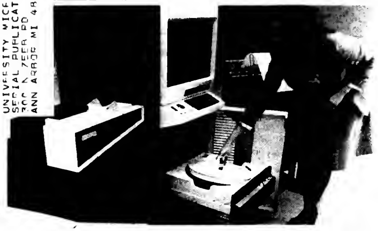

Data storage in this Honeywell Level 6 minicomputer system is provided by cartridge disk unit being loaded by operator.

Modular 16-Bit Minis Initiate Level 6 of Honeywell Series 60

By Esther Surden
Of the CW Staff

NEW YORK – The Honeywell Series 60 Level 6 introduced here last week is a family of modular 16-bit minis with a single I/O bus design.

Memory, an I/O controller, a communications controller and a disk controller are on individual microprocessor boards that plug directly into the Megabus data path.

The Level 6 minis have "attributes of 32-bit machines while maintaining the price levels associated with 16-bit machines," a Honeywell spokesman said.

Presently there are three models in the series: the 6/06, which has a five-slot chassis and can accommodate up to 65K words of semiconductor memory; the 6/34, with up to 32K words of memory and a four-slot chassis; and the 6/36, with up to 65K words of memory and either a 5- or 10-slot chassis.

Honeywell plans to add additional models later this year, a spokesman said.

All peripherals and software for the firm's earlier System 700 can run on the 6/06, but not on the other models in the series, Honeywell said. The Level 6 is an expansion of the Series 60 line, introduced in April 1974.

The 6/34 and 6/36 models are aimed at

(Continued on Page 2)

SSA Planned DP Expansion Called $69 Million Waste

By Edith Holmes
Of the CW Staff

BALTIMORE – While President Gerald R. Ford told Congress and the nation last week that Social Security taxes will have to go up in the coming year, the Social Security Administration (SSA) went ahead with plans to build a $69 million computer facility it doesn't need, a computer specialist with the SSA's DP operation has charged here.

In addition, the SSA recently received congressional approval to build a $2.3 million temporary computer building to house four IBM 370/168s now on order – which are also unnecessary, according to Ferdinand Jung.

Congress granted approval because "SSA has misrepresented the facts as they exist," he said.

The agency, however, has told Jung "in our best judgment, it is absolutely essential for SSA to proceed with the expansion of our existing DP facility and the construction of our new computer center as a vital part of solving the problems which we know exist today and to build for future demands."

Speaking for the SSA, associate commissioner for the Office of Program Operations Robert P. Bynum cited "the rapid legislative and program growth of SSA" and noted the agency's management must always consider the monthly checks it sends to 34 million people.

"We cannot risk taking any precipitous action which would interrupt those operations," he said.

The SSA "is wasting tens of millions of dollars in its present computer operations," Jung testified in appearances before the House and Senate subcommittees on public buildings and grounds on March 26 and Dec. 12 convened for hearings concerning the SSA request for a new building and a temporary computer structure respectively.

"Present capacity more efficiently utilized is more than adequate to handle all of the SSA's computer requirements," he contended.

The SSA employee has devised a plan which calls for a revamping of the entire computer complex within the time needed to build the $69 million building and for much less money.

Following his testimony before the House subcommittee, between Sept. 9 and Oct. 24, he was put on special assignment by the SSA to document his recommendations on how to improve the com-

(Continued on Page 6)

AT&T Attacks IBM Stand on Dataspeed 40

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – IBM and others are attempting to use the Federal Communications Commission (FCC) to prevent or delay AT&T from offering clustered synchronous versions of the Dataspeed 40 CRT terminal, according to the telephone company.

This was one of the charges made by AT&T last week when it responded to Dataspeed 40 tariff objections filed earlier by IBM, the Computer Business Equipment Manufacturers Association (Cbema) and the Computer Industry Association (CIA) before the FCC [CW, Jan. 12].

By seeking to restrict AT&T from offering the Dataspeed 40, IBM, Cbema and CIA are imposing a technological freeze on the telecommunications industry that would move it back into an earlier era, AT&T said. AT&T denied the Dataspeed 40 is a DP product.

Dataspeed 40 services represent "merely an evolutionary technological improvement of services traditionally offered by communications common carriers," AT&T said. Dataspeed 40 had its origins in AT&T private line Morse (telegraph) services by which manually coded information was transmitted by depressing and releasing a telegraph key, Bell said.

The Morse service was replaced with private line teletypewriter service which automatically converted received electrical signals into printed characters. These models 14 and 15 teletypewriters had manual keyboards with no capability for editing errors, and transmission speed was limited by typing skills of the operator.

Later teletypewriter models included the models 19, 20, 28, 33, 35 and 37 which added paper tape and with it editing and error-correcting capabilities, AT&T said.

In August 1974, the Dataspeed 40 was added which "offered medium-speed teletypewriter equipment with associated CRT displays." The Model 40 provided the capability of "entering, displaying, editing, printing, sending and receiving data between two or more locations over a direct communications path.

"The only changes from the earlier equipment were that, in place of electromechanical equipment, Dataspeed 40 uses solid-state circuitry to aid in message preparation and to permit operation at higher speeds," AT&T said.

AT&T took issue with a Cbema claim that new keys on the clustered synchronous version of the Dataspeed 40 are part of the terminal's DP capability. These keys are Display Buffer Addressing and Format Control and "there is nothing in these particular features which can be said to change the character of the Dataspeed 40 service from communications to

(Continued on Page 3)

Police Seek Service Bureau Head For Issuing Bad Payroll Checks

By Nancy French
Of the CW Staff

GRAND RAPIDS, Mich. – A felony warrant has been issued and several civil actions filed against the president of a service bureau here who disappeared earlier this month after issuing thousands of bad payroll checks to his customers' employees.

James Robert Redican, who used his brother's name in running a firm known as Computer Payroll and Accounting Services (CP&AS), is the object of a nationwide manhunt and believed to be traveling east with his wife in a leased Thunderbird. A three-year-old daughter was left with relatives in Lansing.

In addition to charges of embezzlement for misappropriating the money of 300 to 400 clients, a state offense, Redican is also being sought for unlawfully fleeing the jurisdiction with the intent to avoid prosecution, a federal offense, according to Assistant Kent County Prosecutor Donald Johnston.

While it is impossible to estimate how much cash Redican took with him when he fled, he left behind an unknown amount in bad payroll checks and $1.6 million in unpaid Social Security and income taxes, according to an ex-employee of the firm who helped pick up the pieces for defrauded CP&AS customers.

CP&AS processed approximately 85,000 payroll checks monthly for about 425 area businesses. Its procedures, however, were somewhat different from those of other service bureaus, which merely process and issue checks that client companies pay from their own payroll accounts. Billing for services is done separately.

CP&AS collected a bulk check in advance each week to cover the wages, taxes

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'Forms-Based' Link To DBMS Proposed

By Don Leavitt
Of the CW Staff

MONROEVILLE, Pa. – Codasyl's End User Facility Task Group (EUFTG) has proposed the general structure and semantics – but not the syntax – of a "forms-oriented" interface to generalized data base management systems (DBMS).

The proposal, contained in a progress report just released by Codasyl, effectively spells rejection of the basis on which many current user interfaces are built.

The current interfaces claim to be designed for the non-DP-trained end user, the report noted, but in fact they are "similar to computer programming languages, without [any] effort to establish that such interfaces are the best or that they are truly effective."

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Megabus at Heart of Honeywell Level 6

NEW YORK – The Honeywell Series 60 Level 6 family introduced here last week is centered around the 6 Mbyte/sec asynchronous Megabus data path which is 16 bits wide and has a 24-bit address path.

The Megabus, which provides 64 vectored interrupts and 20 traps for identifying program error conditions, has a 300 nsec cycle time.

Priority on the bus relates to physical position, with memory granted the highest and the CPU the lowest priorities. All other boards are prioritized according to user requirements, the firm said.

The 6/36 model's Megabus is expandable to 23 slots into which memory, the CPU and any combination of device, communications and user interface boards can be plugged.

The central processor board includes 18 programmable registers and a set of 107 instructions that provide bit, byte, word and multiword addressing capabilities.

Multiply and divide instructions, a real-time clock and bootstrap loaders are standard CPU features, Honeywell said. A 256-word read-only memory contains the bootstrap routine.

Each board holds 32K words of semiconductor memory in four random-access memory modules. Either byte parity or error-detection and error-correction memory using 6 error-checking bits can be chosen, Honeywell said.

A single Multiple Device Controller (MDC) board handles up to four printer, teleprinter, CRT, card or diskette devices through four separate Device Pacs attached to each board.

Multiple MDCs can be plugged into the Megabus and multiple like devices can be attached to any MDC, Honeywell said. The MDC contains a microprocessor and memory to handle device specific functions.

A separate Mass Storage Controller (MSC) handles up to four cartrdige disk units. The MSC attaches to the Megabus in the same manner as the MDC.

Communications are supported via the Multiline Communications Processor (MLCP), which can control up to eight low- and medium-speed full-duplex lines.

Up to four Communications Pacs per MLCP handle lines of different types and speeds. Users can program the communications instruction set to handle different line protocols, the firm said.

Users' own peripheral controllers can be interfaced to the Level 6 systems when the general-purpose direct memory access interface is added, Honeywell said. Data to and from the user controllers is transferred in 16-bit parallel form.

Honeywell Offers 16-Bit Minis

(Continued from Page 1)

OEMs and systems builders; the 6/06 is aimed at end users, the company added.

The 6/06 is comparable to Digital Equipment Corp.'s PDP-11/10 and -11/40 and the Data General Corp. Eclipse 300, while the 6/34 and 6/36 models are comparable to the DEC PDP-11/04, -11/05 and -11/35, the spokesman said.

System software includes Gcos/BES1 and Gcos/BES2 operating systems. BES1 is a diskette-based multitasking executive and program development system that requires 8K words of memory, a console and dual-diskette unit.

Sequential and random file support for diskette, assembler and utility routines are BES1 features This operating system optionally supports communications and a macro assembler.

BES2 extends support to a generalized macro assembler, Fortran with real-time extensions, additional communications devices and up to 40 million words of cartridge disk, the firm said.

The BES1 software is included with the 6/34 and 6/36 systems. Fortran is available for a $500 one-time license fee; the communications macro assembler license costs $100.

BES2, which will be available in July, is separately priced at $800, the firm said.

Honeywell introduced several peripheral devices for the Level 6 family. These included a 256K diskette with a 31 kbit/sec transfer rate; disk cartridge units with either 2.5M- or 10M-byte capacities; CRTs with 960 characters; and a 165 char./sec serial printer with either a 64- or 96-character set.

Also introduced were line printers that have either 64 or 96-character sets and operate at 300- and 600 line/min or 240- and 480 line/min respectively.

'Maintainability' Feature

A key feature of the Level 6 systems is what Honeywell termed their "maintainability."

"The high level of accessibility coupled with diagnostics should greatly simplify the task of maintaining the system," the spokesman said. Modular construction will allow the firm to implement components as they are introduced, rather than having to redesign the system, he added.

Diagnostics include a "shoelace" circuit that ties together the I/O controller, communications controller and disk controller boards. Each board uses the circuit to check its Megabus connection and perform a basic logic test.

A malfunction is apparent to the operator, the firm said, because an LED display remains lit.

A typical 6/34 system with 16K words of memory, CRT, dual diskette, 600 line/min printer and Fortran compiler costs $17,500. A 6/36 with 24K words of memory, two device controllers, six CRTs, a 300 line/min printer and 1.25M words of disk storage costs $39,850.

A rack-mounted 6/06 for remote job entry with 24K words of memory, 2.5 million words of removable disk storage, 300 line/min printer, 300 card/min reader and keyboard send/receive teleprinter costs $42,300, the firm said. The 8K-word rack-mountable 6/34 with parity costs $2,634 in quantities of 50.

Winner Also Appeals Verdict in Catamore

PROVIDENCE, R.I. – As expected, the verdict in the IBM vs. Catamore Enterprises, Inc. case is being appealed by IBM – but Catamore, which was awarded $11.4 million, is also appealing the verdict, notices of appeals recently filed with the First Circuit Court of Appeals indicated.

The IBM notice said the firm will appeal both the verdict and Judge Raymond J. Pettine's order denying its motion for a different-verdict or, alternatively, a new trial [CW, Dec. 24].

Catamore indicated in its notice to file a cross-appeal it too will appeal the verdict.

An IBM spokesman said IBM's papers will not be filed for several months. Catamore intends to file within a month of the IBM filing.

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Banks 'Naive' About Security

Customer Identification Seen as Great EFTS Problem

By Catherine Arnst
Of the CW Staff

BOSTON – Proper identification of the customer is one of the greatest security problems in an electronic funds transfer system (EFTS), panelists at the National Association of Mutual Savings Banks Conference here last week agreed.

"The banking community is naive about problems of card security," Theodore Magida of the Mitre Corp. said during a presentation of a study of security problems done by his company for the American Bankers Association.

The customer can be identified by what he has, knows or is, Magida said. What he has can be a bank identification card, a public identification card such as a driver's license or a machine-readable bank card.

Bank cards are vulnerable to counterfeiting, fraudulent encoding (valid information is written on a blank card), skimming (information is transferred from one card to another), buffering (a valid card is used and then the information rewritten).

One method suggested by Mitre to prevent these methods was to imprint a special track on the card made up of either random bars, photo-deposited magnetics or random magnetic patterns, which could be read by a special head that would sense any distortions.

Identifying a customer by what he knows would require use of either personal data or a personal identification number (PIN), Magida said. By obtaining a combination of an account number and a PIN, however, anyone could gain access to the entire system, he warned.

Nontransferrable personal attributes could be used to identify a customer by what he is, but the attributes used must be accepted by the public, reliable and inexpensive, he said.

Automated personal identification methods that are both reliable and cost-effective, while the most promising of any method, are at least five to 10 years away,

Terminals are vulnerable to hardware electronic bugs, theft of software and journal tapes, discarded receipts and carbon copies and physical attacks, Magida said. There is also the danger of a fraudulent authorization by an employee.

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At NAMSB

The most critical part of EFTS, however, is its communications, Magida said.

Most banks will be using on-line systems that are vulnerable to line taps, tampering with either hardware or software, message modifications and system interruptions.

In five or 10 years, EFTS will be using satellite communications, which will leave the communications system of an operation wide open, Magida said.

Since it is technically easy to capture data, Magida recommended end-to-end message authentication techniques to ensure the integrity of the system.

The security of the computer is difficult to ensure because of its availability to so many groups, Magida said. Programmers, service personnel, terminal users and service users all have access to the computer.

Encryption Recommended

Encryption was the method recommended by Seymour Jeffery, chief of the division of Systems and Software of the National Bureau of Standards (NBS).

A "data encryption milestone" was reached with a set of standards developed by the NBS that will be published in March, he said.

The key to this computer encryption system is an algorithm used to convert any number entered into code. This key is not subject to conventional mathematical analysis, he said.

The strength of data encryption is that it is unambiguous, flexible in application and difficult to modify, and the encryption device can be validated.

Devices used to implement the algorithm could be a microprocessor, small computer or hybrid microprocessor, Jeffery said.

The third member of the panel, Dr. M.M. Atalla, president of Atalla Technovations, agreed that encryption was the best means of securing EFTS.

"There is nothing we cannot do technologically; it is economics that limits us," he said.

To figure the total cost of security for a system, a banker must add his total losses and the cost of keeping these losses down, Atalla said. It would make no sense to spend more on security than the cost of the losses without the measures, he suggested.

"The only viable and cost-justified method of identification at this time is the personal code method," he said.

Four Products for On-Line Transactions Unveiled

By a CW Staff Writer

BOSTON – Getting bank transactions on-line was the focus of the exhibits at the National Association of Mutual Savings Banks (NAMSB) conference here last week, and four products introduced by Bunker Ramo and Atalla Technovations were geared toward that end.

Bunker Ramo unveiled three peripheral devices for its Branch Terminal System (BTS) 2000, including an administrative CRT, a punched card reader and an auxiliary storage device.

The BTS 2060 administrative CRT is a 12-in. stand-alone display with detachable keyboard that can be used for opening new accounts, inquiring on central-information file account status and interrogating various computer-stored information, the company said.

It can display 2,000 characters formatted in 25 lines of 80 characters each with a 5 by 7 dot matrix character type. It has an Ascii 128-character set, and the character generator is an MOS read-only memory (ROM). Modes include block, format, character and program entry.

The unit is priced at $3,395.

The BTS 2092 punched card reader, when operating through an on-line 2001 Universal teller terminal, enables a branch office to process mortgage and loan payments directly into the bank's central computer, accepting either 80- or 51-column cards.

It reads 210 card/min and, when used with the Model 2094 tape cassette, payment can be stored locally in the event of computer on-line failures. This unit is priced at $3,850.

Both devices interface with the Bunker Ramo 2001 Universal teller terminal via the BTS 2008 peripheral device controller.

Auxiliary Storage Device

Bunker Ramo's third product is the BTS 2069 auxiliary storage device, which supercedes the earlier Model 2094/95. It loads the terminal operating system and application program when needed and, in the event of a system failure, can capture data from each transaction and record it onto a cassette.

The internal operation of the device provides for validation of each record to ensure data integrity as well as proper transmission check, the company said. It further provides the capability to search and display any record stored on a cassette.

The product is available at $1,495 from the firm at 35 Nutmeg Drive, Trumbull, Conn., 06609.

Atalla Technovations introduced an addition to its Identikey system of personal identification for financial institutions which extends it to shared-facility operations.

The Identikey device consists of two keypads – one for the customer and one for the teller. The customer types in a secret code of his own choosing along with his account number which is transformed by the device, containing a microprocessor, into a third code number for the teller.

The new device, called the Interchange Identikey, is consistent and compatible with the various switching networks contemplated, the company said.

It is capable of resetting itself electronically to any one of 64,000 irreversible, nonlinear algorithms as directed by card data information, it added.

The Identikey is a stand-alone machine that contains no buffers or memory, so it cannot compromise the system by generating the code number. It will go on the market March 1 at a cost of $650.

Atalla Technovations is located at 505 W. Olive Ave., Suite 165, Sunnyvale, Calif. 94086.

AT&T Defends Dataspeed Tariff

(Continued from Page 1)

data processing, AT&T told the FCC.

Taking issue with earlier charges that the Dataspeed 40 is a data processing device instead of a communications device, AT&T said that simply because a device communicates with a computer or operates in a data processing system does not take it outside the control of the Communications Act of 1934.

Under this act AT&T devices are offered on a regulated basis as a product from a regulated common carrier.

The definition that data processing includes any function performed by a computer "must be rejected out of hand" because "computer are utilized for the provision of conventional communications services," Bell said.

AT&T took issue with the IBM suggestion that the 1956 AT&T Consent Decree with the Justice Department be modified. IBM in its filing with the FCC had suggested the commission might propose to the Justice Department that the decree be modified so that the Dataspeed 40 could be offered by Bell on a nonregulated basis.

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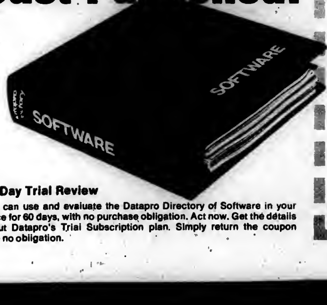

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Service Bureau Head Object of Nationwide Manhunt

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and Social Security deductions of its clients' employees as well as processing costs. The firm then deposited the bulk check in a CP&AS general account and issued payroll checks for all its customers from that account.

"In some cases CP&AS was charging as little as $25 to process a payroll that must have cost it $50 to do. Besides that, it was including free pickup and delivery service," one competitor said.

"We couldn't compete with [Redican] – we all thought he was investing the float to make up the difference," he added, explaining the "float" builds up in such an account when employees don't cash thier checks immediately.

And quite a float it was, too, according to estimates by the former CP&AS employee, who indicated the firm had anywhere from $3 million to $5 million in the general account at all times.

The trouble started around mid-December when employees of several of CP&AS customers attempted to cash their paychecks and were told there were insufficient funds in the CP&AS account.

When customers reported this to CP&AS, additional funds were deposited and the firm made good on the checks. At the time, a CP&AS spokesman assured customers as well as local newspaper reporters that the company was "not going under or broke. We've just overgrown the little hometown bank."

Things were "hectic" around CP&AS the week before Christmas and Christmas week because checks again began to bounce, according to former employees.

"Mr. Redican kept telephoning in to the office and saying, 'Just tell the customers everything is okay' or 'We've got the money' or 'We are getting the money,'" they said.

Four employees had had enough by New Year's Eve and walked out.

The 50 employees of CP&AS were paid through Dec. 31 and most are now looking for jobs. Several were hired by Kor Data Systems, another service bureau here.

Jack Orloff, president of Kor Data Systems, took over processing the payroll for some of the larger accounts serviced by CP&AS. Other service bureaus and several local banks took over processing for some of the others.

More Warrants Possible

Johnston said from the prosecutor's office more warrants may be issued as authorities continue to meet with attorneys representing at least 60 companies that have filed complaints.

Redican was passing as his brother Thomas, who is believed to be living in Hawaii.

According to Johnston, "the suggestion was made that he went bankrupt in New York and used his brother's name to go into business here because he thought he would have a better chance getting started."

Among those owed by the firm is Honeywell Information Systems, from whom Redican leased his systems.

Redican was described by those who knew him as "a big spender." Among the possessions he and his wife Gail left behind were a home on Lake Macatawa, a 47-foot sailing yacht and a Cessna 421 twin-engine aircraft.

Codasyl DBMS Link Designed for Novices

(Continued from Page 1)

Paper-based files, folders and forms are familiar to intelligent DBMS end users, so automated versions of them should be used to make the data base more accessible to the end users, the report contended.

One reason for release of the report at this time, a EUFTG spokesman said, is to solicit outside comments on the work to date and to encourage more interested people to join the group in its continuing work.

The task group proposed a "facility" which would enable the user to get data-based "files," "forms" or groups of forms or "items" at his terminal without concern for the programming steps needed to get this material.

Similarly, the facility would enable the user to work with the contents of these combinations of data – each of which was defined in the report – without programming.

Specifically, the task group envisioned its proposal as an extension to the facilities prescribed for a generalized DBMS by the 1971 Codasyl Data Base Task Group report. Data Description and Data Manipulation languages will still be part of the scene, as will data dictionaries and data base administrators, the new report said.

The facility "will exist within a software configuration that is at least a combination of an operating system and a DBMS. The [end user facility] is not capable of operating in a stand-alone environment," the task group added.

Human factors are the driving force behind this concept and there is a "strong dependence" on the data base administrator working with the end user to make it a success, task group chairman Henry C. Lefkovits explained when he released the report.

A recognition of the end user which this approach is intended to serve was also an important part of the document. No facility can be shaped to serve all users equally effectively; so the task group picked a target for this first facility.

The user is "assumed to be competent in his job, without benefit of the [end user facility]. He may have a speciality occupation requiring extensive training or education" but, the report continued, "the specialty is not data processing or related specialties."

The "files," "folders" and "forms" the user accesses under this facility will be individually designed by the user or the data base administrator or both so they fit the user's real needs.

The complete text of the EUFTG progress report will be published in February or March in *FDT Bulletin* of the Association for Computing Machinery's (ACM) Special Interest Group on Management of Data. Copies of Vol. 7 No. 3 cost $2 and can be ordered from ACM, 1133 Avenue of the Americas, New York, N.Y. 10036.

Comments about the proposal should be addressed to Lefkovits, a DP consultant who can be reached through P.O. Box 297, Harvard, Mass. 01451.

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Recommends Mix of Vendors

Consultant Tells Arkansas Consolidation Not Answer

By Patrick Ward
Of the CW Staff

LITTLE ROCK, Ark. – "It is a fallacy in data processing that bigger computers bring cost savings."

Thus Gordon E. Stokes, a consultant for the state of Arkansas, rejected the philosophy that a state government can alwsys save money by setting up a central DP site and replacing users' mid-sized machines with remote job entry terminals.

"The main reason for a big computer . . . is to run big programs. If you make the big machine look like five small machines, you may as well run five small machines," Stokes said in a report prepared for the Arkansas State Legislative Communications Committee.

Stokes also commented on why Arkansas' DP equipment procurement practices have stirred up charges of favoritism to IBM [CW, June 25, Sept. 24].

The state's central computing facility, he said, shows "a high dependence upon IBM and [its] representatives. I observed very little study of systems outside of the IBM products.

"There was not only a lack of knowledge of these systems, but no real desire to be aware of any other operating equipment," Stokes said.

"Arkansas has been wrestling with the problems of centralized and consolidation of computer facilities for several years now," Stokes observed.

Some states, including Kentucky [CW, Aug. 21, 1974], have set up a central computer facility to do the DP work which user departments previously handled on their own CPUs. These users typically access the central DP facility through remote job entry terminals.

But Arkansas' user departments are reluctant to surrender their own machines, Stokes found.

"The general feelings of management and staff people throughout the state [government] are against being dependent upon [the central facility's] computers snd personnel for their computing work.

"Part of these feelings are based upon historical happenings and part of them are a natural reluctance to become dependent on a group over which you have absolutely no control," Stokes said.

The state's Information Systems Executive Committee, on the other hand, feels a move toward data base technology in Arkansas DP would be "the panacea for many of the ills of the state in terms of providing management information that would allow state government to . . . perform its function better," Stokes said.

While large central machines can provide economies of scale, there is a limit to those savings, Stokes said.

"I think Arkansas needs one fairly large-sized machine. The users will be much better served and more effective in their work by allowing them to have small machines that do a lot of their work and use those machines to access the big computer for big jobs.

"This lets users take advantage of the best of both worlds," the consultant said.

Stokes dismissed last year's controversial request for proposals for a central facility computer as premature and ill-designed.

Even so, Arkansas needs a larger computer, Stokes said, and the machine will have to be a 370 because it will be backing up a criminal justice system running on a 370/145.

Arkansas should make sure it is necessary to continuously back up the criminal justice system, Stokes said.

Vote for Mixed Vendors

Stokes recommended Arkansas bring in a used 370/158, put an independent vendor's add-on memory on the state's 370/145 and take a look at plug-compatible peripheral suppliers.

While mixing vendors "increases the responsibility of management . . . it can result in savings and increased capability for the state," he said.

Arkansas should be wary of rushing into data base software development, Stokes cautioned.

"The programs . . . should be kept as free as possible from any data base management protocol. Good modular programming techniques should be utilized with the data base interface modules well isolated so they can be easily changed.

"This is particularly important because of the research and rapid changes that are taking place in the field of data base systems," he said.

The state should also "reject" any data base management scheme that requires control statements to be an integral part of the applications program," Stokes said.

By the time Arkansas is "ready to take advantage of their [Information Systems Plan], distributed . . . data bases will be a reality. The state should be in a position to utilize the advantages of this type of system," he concluded.

Privacy Group Plans Credit Card Hearings

WASHINGTON, D.C. – The Privacy Protection Study Commission will conduct public hearings Feb. 11-12 on the recordkeeping practices of credit card issuers in the travel, hotel and entertainment world where credit records might provide the ability to generate information on the movements, purchases, associations and lifestyles of individual consumers.

The hearings will be held in Room 305, 26 Federal Plaza, New York City.

Interested parties who would like to express their views should notify the commission in writing as soon as possible.

The commission also intends to examine the expriences of federal and state regulators in connection with the Fair Credit Billing Act, the Fair Credit Reporting Act and related statutes.

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SSA Expansion Plans Assailed as Waste of $69 Million

(Continued from Page 1)

puter operations.

An IBM systems engineer and member of Control Data Corp. management, Western States Bank Card Association and the Master Charge Group in San Francisco before coming to SSA in December 1973, Jung recommended the SSA transfer all work performed on its medium-scale operation, consisting of 10 IBM 360/30s and two Univac 70/35s, to its large-scale operation. That operation is made up of two 370/168s, two 370/165s and 13 360/65s.

He also suggested the space acquired by scrapping the medium-scale operation, approximately 14,000 square feet, be readied to house two loosely coupled 370/168 multiprocessors to assist the current large-scale setup in handling the additional workload.

Response to Recommendations

In response to these recommendations, however, Jung was told "SSA computer facility experts have determined 20,000 square feet of space will be needed to contain either four IBM 370/168 uniprocessors or two IBM 370/168 multiprocessor systems.

"Further, even if floor space were available, the required medium-scale program conversions cannot be completed until October 1976," the SSA report answering Jung's proposals continued.

"SSA would have to convert 34 programs written for the IBM 360/30 Basic Programming Support (BPS) system, 40 programs written for the IBM 360/30 Disk Operating System (DOS), 1,000 IBM 360/30 DOS utility job control streams and procedures, as well as 158 programs coded for the RCA 301 computer system but supported by SSA Univac 70/35 computer systems operating in the RCA 301 emulation mode. Approximately 49 man-years would be required to convert these programs on SSA large-scale computer systems.

"The major medium-scale program conversion problem is the 158 RCA 301 programs supported by two Univac 70/35 computer systems," the SSA contended in its response. "The conversion of the RCA 301 programs to IBM 370 Cobol would require 80 new programs. This is based on the limited Univac peripheral resources which dictated small, multistep modules.

"The average manpower effort per program would be three man-months, thereby requiring a total of 20 man-years," the response said.

According to SSA, Jung noted, the remaining 29 man-years would then be used to convert the 34 BPS programs, 40 DOS programs and 1,000 JCL streams.

Arguments 'Absurd'

Jung maintained these arguments for ignoring his recommendations, building the temporary facility and planning for the new SSA computer center housing were "absolutely absurd."

First of all, the administration is anticipating the need for "way too much space" in its contention that 20,000 square feet are necessary to accommodate two 370/168 multiprocessors, he said.

In no way does the SSA's response "take into consideration the load balancing and tape drive assignment capabilities of these multiprocessors," Jung added.

In addition, the time the SSA said is required to accomplish conversion of RCA 301 programs to IBM 370 Cobol indicated each programmer now at the administration produces one program every three months.

"At an average programmer salary of $20,000, the cost of each program would then be $5,000," Jung said, adding that these would be programs written for a very small machine.

A programmer in Jung's branch of the SSA's computer operations – the Special Projects Branch, which is responsible for telecommunications at the agency – has written more than 20 programs in 26 months. Jung contended this is more nearly the average programmer output.

"Several programmers have written more than 20 programs in the two years I have been at SSA," he said, adding the programs they produced "were considerably more complex than those that would be written for BPS/DOS-level machines."

Indications of Savings

Jung's study has not been extensive enough to predict exactly how much money his plan would save the government and its taxpayers, he said. As an indication of the magnitude of the savings he believes are possible and of the feasibility of his plan in general, however, he described the results of minor changes he recommended for two SSA programs.

On the first day of his special assignment to devise the revamping plan, Jung asked for two SSA program listings and, selecting a folder control system program, made some simple suggestions which he submitted to the SSA's Division of Computer Technology.

Attention to this particular program reduced by between 80% and 90% the number of master file records now processed during each daily run.

In a second program – part of SSA's daily health insurance system – benchmark tests revealed runtime could be reduced from 39 to 30 minutes, representing a total runtime savings of over 23%.

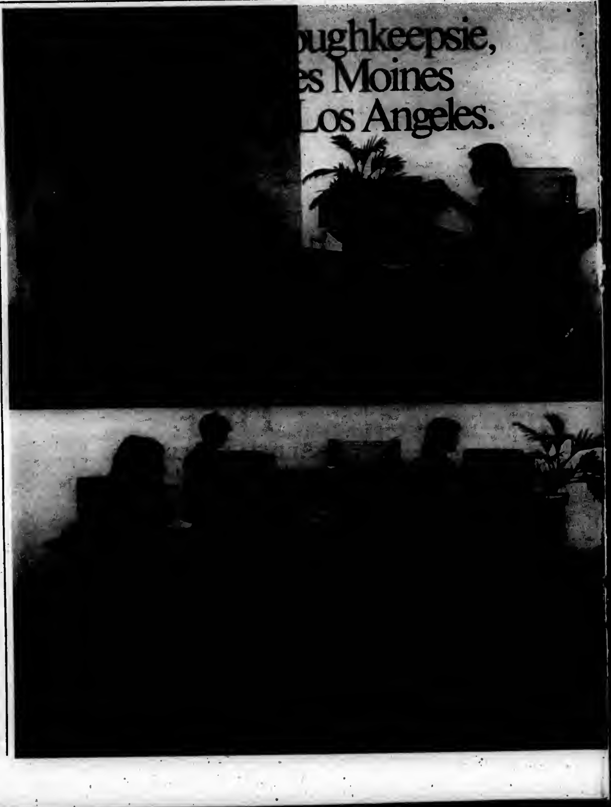
The savings from changes made in these two programs and resulting from other similar recommendations can be measured as almost the use of one of SSA's 360/65s each day, he said.

The computer specialist argued most of the programming systems at SSA are in similar bad shape. "With minor efforts," however, "we can recover many hours of wasted computer time each day."

Jung's special assignment lasted a total of 45 days. Working at home to continue his study and revise his initial work, he then presented his report to members of Congress and the General Accounting Office, which is conducting an independent audit of SSA computer operations.

While Bynum expressed SSA's appreciation for the work done by Jung and stressed the programmer's and the administration's common goals, he said "management decisions must be made from a broad perspective of legislative resources and service needs and cannot be based only on technological considerations."

The SSA will issue a full analysis of Jung's recommendations soon, an agency spokesman added.



But Privacy Proponents Suspicious

U.S. Plans to Automate Issuance, Use of Passports

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The U.S. Passport Office here plans to automate preparation and use of passports this year – a measure that would involve dumping its glue pots and slave typewriters in favor of minicomputer-driven printers and magnetic coding strips.

In some quarters the project has been linked with a "national identity card" supported by Passport Office Director Frances Knight and, by association, received a black eye.

However, on closer examination, the new Travel Document and Issuance System (TDIS) would seem to pose no greater threats to privacy than the system currently in use, as long as it is used as passport officials claimed it will be, some critics said.

Precise equipment specifications for the TDIS have not yet been developed, but a Passport Office spokesman explained plans call for a decentralized issuing procedure using minicomputers in each issuing location.

Data from passport applications will be entered via CRT terminals, allowing for error correction before data is fed into the minicomputers for storage.

The data will be forwarded by the minicomputer to a central processor for checking against the State Department's list of individuals who, for some reason, have been forbidden to obtain passports. Assuming the applicants pass this test, the issuance process begins.

Printers driven by minicomputers will imprint identifying data, such as place and date of birth and hair and eye color, in both English and French on passport inserts that later will be assembled into the book.

These inserts will also carry the individual's photograph, which may or may not be printed by computer. The entire page will then be laminated, the spokesman said.

Finally, a magnetic strip on the inside back cover of the document will be encoded with the same data, making the passport machine-readable as well.

Passport officials said the encoded data will be the same as that printed in the front of the document and readable by human eye. The strips will enable countries with more sophisticated equipment to read passports by machine for checking against digitized lists of unacceptable persons, speeding processing at ports of entry.

On the other hand, countries without computers could continue to read the data visually, stamping the pages with entry dates and other pertinent information as they always have.

The new passport, which will conform with the recommendations of the International Civil Aviation Organization, is part of a standardization effort that has produced a common passport format for use world-wide. It will be smaller – shrinking to 4.92 in. by 3.37 in. from the previous 6 in. by 3-3/4 in. – to fit in a man's shirt pocket.

"The passport marries the old with the new so that nations all over the world can use the same documents," the spokesman said.

Privacy proponents are suspicious of the coding strips, however, and have claimed they could be used to include data such as previous drug charges or other similar data on the passport without the bearer's knowledge. Passport officials denied this is their intention.

Ready for Change

Passport preparation has not changed since the introduction of the Singer-Friden Flexiwriter. With the exception of printing, the documents are prepared manually to a great extent.

Information from passport applications is punched onto paper tapes used to drive the Flexiwriters. Data from the paper tape is then transferred to magnetic tape to run applicants' names against the State Department's list of "undesirables." These are normally run in batches of 30, the spokesman said.

The computer then prints out a list of those who have no restrictions on travel for passport preparation clerks. Booklets are inserted into the paper tape-driven slave typewriters and identifying data is typed.

Then photos are glued by hand and another "manual" stamping machine is used to apply the seal and legend along one side of the photograph.

The TDIS system is expected to save $31 million over a 10-year period, according to estimates by the Office of Management and Budget.

The Passport Office spokesman explained that once the new system gets congressional approval, the conversion will begin.

Funds have been held up by Rep. Wayne Hays (D-Ohio), chairman of the House Subcommittee on International Operations. It now appears Hays has no objections on privacy grounds but rather was miffed because passport officials failed to brief his committee on their plans, sources said.

Nebraska Now Part Of NCIC/CCH System

WASHINGTON, D.C. – The state of Nebraska has begun entering and updating records in the National Crime Information Center's (NCIC) Computerized Criminal History (CCH) system, operated by the Federal Bureau of Investigation.

This brings to seven the number of states plus the District of Columbia that participate in the CCH system.

"Fully participating" states include Arizona, Florida, Illinois, California, Michigan and Virginia.

A total of 36 other states access the files without contributing records.

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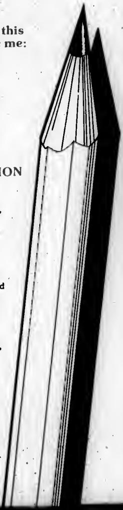

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Privacy Laws May Usher In 'Defensive DP': Hopper

By Esther Surden
Of the CW Staff

WINDSOR LOCKS, Conn. – Faced with state and federal privacy laws, DP managers may be entering an era of "defensive computing," Capt. Grace M. Hopper recently warned a joint meeting of the Hartford, Conn., and Springfield, Mass., Data Processing Management Association (DPMA) chapters.

Hopper is head of the Navy's Programming Languages Section and a former DPMA "Man of the Year."

DP managers are suddenly finding the privacy laws require them to notify every individual on file there is a record on him, send him the content and permit him to make corrections.

They are also obliged to keep the files "accurate, complete and current," she said, but asked, "What does 'accurate, complete and current' mean?

"Many of these questions require management decisions. Management must decide such things as what is current and how often a file must be updated. It is up to computer people to warn management.

"All the privacy laws sound like apple pie and motherhood," she continued, "and everyone will vote for them. That's the dangerous thing about them."

The privacy laws may triple the cost of maintaining all personnel files, she added.

"This probably means that, for the next five years, we will be doing defensive computing just as doctors are practicing defensive medicine in response to malpractice suits," Hopper said.

Dangerous Saying

On the future of data processing, Hopper said the most dangerous phrase a DP manager can use is "We've always done it that way."

In the past "we have failed to look into the future for all possible 'enemy actions,' " she said. "If we base our plans on the present, we fall behind and the cost of carrying out something may be more costly than not implementing it."

But "there is a line," she cautioned. "If you step over it, you don't get the budget."

DP managers, however, must come as close to it as they can, and they have a second responsibility. "You must keep pushing the line out further," she said.

"We must not only accept new concepts," Hopper told the managers, "we must manage their development and growth."

More Computer Power

Faster machines are needed to manage complex problems, she told the group. The Mark 1 added in 333 msec, she continued, and today's machines can add in 300 nsec, but a machine that will add in 300 pico seconds is needed.

This, however, is pushing the velocity of light, she said.

"We live in a world of increasing population and we must increase food supplies," Hopper said. One way to do this would be with better weather forecasting.

The technology to do the forecasting exists, she continued, but on today's machines it is costly and takes too long. More powerful computers could give more information on the economy, ecology and pollution, she said.

"To get more computer power, we don't need bigger computers, we should get a system of computers," she said.

Looking at the group, Hopper said, "You can immediately say it would cost too much, but the price of computing power is coming down."

Pointing to several microprocessor chips, she told the managers "we have to change an awful lot of people's minds.

"Can you imagine telling a DP room this will do the job? It will be difficult to tell people they have that power and can buy it for $250."

Interesting outgrowths of the computers on a chip are clubs for young people who pool their money to buy a computer, she said. Software for the micros is being developed by some of the best programmers in the country, spurred by contests for prizes, she noted.

Mass. Governor Becomes Fourth To Sign Privacy Protection Act

By Nancy French
Of the CW Staff

BOSTON – Massachusetts Gov. Michael S. Dukakis last month signed this state's first Fair Information Practices Act, bringing to four the number of states with such a law.

Minnesota, Utah and Arkansas have already passed fair information practices legislation.

The law, which applies only to state agencies, requires these "data holders" to identify and then inform all employees with direct responsibility for data systems of the new law.

They must also be informed of the civil remedies available to individuals whose rights they may violate by mishandling data.

The law also requires agencies to maintain a complete and accurate record of every access to and every use of any personal data in the system and its intended use.

Each agency, upon request of the data subject, must provide him with a list of the uses made of his personal data along with the identify of all persons and organizations which have gained access to that data.

Further, the law requires that an individual be informed in writing, upon his request, whether he is a data subject in the personal data system and, if so, be given that data in a form comprehensible to him.

In the case of medical or psychiatric data, information may be made available to a physician treating a data subject upon that physician's request if a medical or psychiatric emergency arises which makes it impossible for the data subject to approve the release of such data, provided the individual is informed of the access after the emergency ends.

Every agency that operates a personal data system – either manual or automated – must give the Secretary of State before Sept. 1 a list of all such systems – detailing the name, nature and purpose of the system, the number of persons on whom data is being maintained, the categories of data maintained and the agency's policies and practices regarding data storage, retention and disposal.

Once a year, the Secretary of State must publish a report containing all of the notices filed.

The act takes effect on July 1.

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Editorial

Front and Center

After years of pleasing many users at two ends of the mainframe spectrum, Digital Equipment Corp. has moved firmly into the mainstream of computer use with the introduction of the Decsystem-2040, which is to be the first model in a range of middle-of-the-line systems [CW, Jan. 19].

DEC's greatest success in the past has been clearly in the minicomputer area, where it accounts for the lion's share of the marketplace, and in the sophisticated time-sharing user area, where it has had great success with the Decsystem-10 in commercial time-sharing houses and universities.

Now, with the Decsystem-20 line, the firm is clearly going after medium to large commercial users, particularly those who want to move to time-sharing – the main body of the marketplace.

DEC's traditional markets offer far different problems and opportunities than does the new area, and computer users will have to keep a careful eye on the firm's performance with its initial users before adding it wholeheartedly to their selection lists.

In the minicomputer area, for example, DEC has been known largely as an "iron" house, selling hardware with little or no programming – particularly applications – support except in specialized market segments.

At the same time. it has not been known for after-sale service and maintenance in this area, often leaving programming, maintenance and service to the user or to a systems house.

Much of this has been changing over the past few years, but DEC still has not established a track record in the areas of software support and maintenance to match any of the traditional mainframe makers.

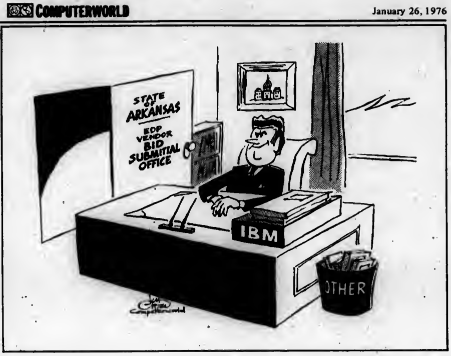
The same holds true to some degree in the Decsystem-10 area, where DEC has supplied excellent operating systems and tools for the use of sophisticated end users, but little in the way of applications support.

The firm is now in a whole new ball game, where maintenance and software support will play an increasing role – perhaps more important than the capabilities of hardware itself.

Users should watch the firm's performance in these areas carefully.

If DEC proves it can do the job needed – and make the necessary investment – to provide proper support and maintenance services, then users should welcome it to the fold.

But, if it cannot supply that type of support, the most sophisticated hardware in the world will be useless.



Letters to the Editor

Grosch's Suggested Solutions In Operation for Several Years

After reading Herb Grosch's column, "The Problem of Identity" [CW, Jan. 12], I was very much in sympathy with his frustration in trying to cash a check.

However, Grosch's article implied his suggested solutions have not yet been implemented. The fact is that such systems have been operating for years.

Standards for cards already exist within the American National Standards Institute (Ansi). These standards cover size, embossing, magnetic encoding and similar parameters.

These standards are respected by the industry because of the current and impending widespread installation of terminal equipment for purposes of credit verification, check cashing and a multitude of services commonly known as electronic funds transfer.

Inexpensive terminals for these systems are available from various suppliers. The specific terminal described by Grosch is already supplied by the very manufacturer he suggested.

Requirements for personal identification are currently satisfied in part by use of special codes known only to the customer and the data base. Other means of personal identification such as fingerprint recognition or signature recognition are in various stages of development or evaluation. Methods of preventing fraudulent card use have been developed.

Millions of consumers currently are taking advantage of the simplified and convenient check cashing, cash withdrawal, deposit, funds transfer or credit authorization services provided by the tens of thousands of terminals already installed. Plans are being laid to expand these services nationwide.

All of this information is well-documented in several fine industry publications.

Victor S. Levadi

Cleveland, Ohio

Misunderstood Auditing Role

In the Dec. 24 article quoting Dr. Ruth Davis on auditing and privacy, it is evident there is a serious misunderstanding of the role of auditing.

Whether it involves a computer or not, auditing cannot, by definition, prove that an operation "actually performs its intended functions in all cases and over all conditions."

Professional audit testing is usually performed at a sufficient level of detail to comment on overall reasonableness based on procedural controls in effect. Total assurance is hardly ever given either by auditors or DPers themselves.

Additionally, auditors worthy of the name place the evaluation of audit trails as a materially important element of any review of internal control. Apparently "recent DP literature" is also negligent in understanding this.

The need for improved techniques within auditing is incontrovertibly true. However, much good work which can offer confidence is being performed today by professional auditors.

John A. Gianola
DP Auditor

Boston, Mass.

Performance Data Available

I was happy to see the notification of validation summary reports (VSR) on Cobol compilers available from the Federal Cobol Compiler Testing Service appear in the Dec. 31/Jan. 5 issue of *Computerworld*.

However, as president of the only nonhardware vendor company to make the list, I was somewhat disappointed to see our name so badly abbreviated.

If CW readers are interested in some performance data, none of which is carried in the VSR, I would be happy to supply it.

Steven S. Herrick
President

Computer Linguistics, Inc.
Albany, N.Y.

Noise Problem Solved for $1

In the Dec. 17 issue, an article appeared concerning a Quietizer for the Decwriter II for $279.50.

If the noise problem is from the cooling fan and not the printing element, there is a much cheaper solution. In fact there are two solutions.

One is to remove the fan and cut away the slotted opening replacing it with a screen or other grill work with more open area.

The second is to remove the fan and cut pieces of tubing approximately 30 mm in length, go to the local hardware store and purchase four standard cabinet door pull screws of the proper length (30 mm more than the original screws) and set the fan back from the side of the case by 30 mm.

In the latter case, you may wish to place tape between the extensions to ensure only outside air is being pulled in.

In either case, the fan noise level can be reduced from over 70 db to between 5 db and 10 db when measured at five feet from the front of the unit, for less than $1 and a little bit of labor.

John C. Biddle

Bakersfield, Calif.

(Other letters on Page 16.)

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Grumpy

Sometimes it has been hard to assign the appropriate Disneyworld names to the dwarfs – perhaps I should say, to the surviving dwarfs. "Dopey," for instance, passed from General Electric to RCA and is now vied for by several of the dumber IBM competitors. One thinks quickly of Honeywell, but their curious and rather spectacular and unexpected convulsions point toward "Sneezy." "Happy," which I suppose in a nonfairy-tale context could be preceded by "Fat-And-," clearly would be DEC nowadays; "Sleepy" is probably Burroughs, the don't-bother-me company, and so on.

But there has never been the faintest doubt, from the very early years of the Snow White parable, about "Grumpy." That just had to be Control Data, and still is. Wasn't just Bill Norris, either, although his ugly moods and rough language have been notorious for three decades. And it wasn't Norris plus Seymour Cray, the dour genius of the Wisconsin bush; it wasn't just people, in fact, but the whole corporate stance.

Some of this comes from the antediluvian origins of the outfit. It began in deep shadow, as a supplier of zero-th generation gear to the cryptocommunity: the Arlington and the Nebraska Avenue predecessors of NSA. Key people wore uniforms, which seldom engenders much warmth (Aunt Grace is a much-loved exception – but look at Howard Aiken!). Then, when Engineering Research Associates was formed, and the first hints of drum expertise and of what is now the 1100 series began to emerge, there were long and dreary economic struggles, culminating in forced subordination to the Jim Rand era of what is now Oonivac.

Next, covert and overt rebellion, followed by the weanling of CDC. And lawsuits, especially over the 1604 origins. And more trouble with money. And major dependence on the AEC as customers, and the intelligence people, both pretty overbearing. Oh, you can see why the milk of human kindness flowed so sparsely in Norris country.

Finally, there was the climate: the dour Norse winter, with Seymour mumbling over his runes back in the cave, and the finance boys wrangling over the bare-picked bones near the fire.

The brief spring of aerospace turned into a deceptive summer, and buoyed by the most unrealistic stock market since 1929, Control Data bought up a major source of money. True, they had to take a whole squad of low-horizon beancounters along with the keys to the vault – but it was still a master stroke, and will be remembered along with Max Palevsky's titanic ripoff when the financial history of our racket is finally written.

So now we see that they came by their orneriness early on, and understandably. What of the future? Is Grumpy a healthy dwarf? Is he a dwarf at all, or has he abandoned dwarfdom? Has he, like the princess in another fairy story, been kissed awake by the handsome Service Bureau Corporation, to live happily ever after in another part of the ADP forest, away from Snow White and her entourage?

I believe so. I think Norris and his minions speak true when they say they provide computer *services*, not just – or even primarily – hardware. Moreover, in all fairness I have to say that Cybernet led in that direction well before IBM cozened Uncle Bill into relieving them of SBC and its undignified working space. I think the CDC services people are serious contenders, along with GE's far-flung appendicle, for the heavy service business.

That doesn't mean a withdrawal from the peripherals market. On the contrary, with very solid engineering and manufacturing skills and a surprisingly good top management, and with a quiet takeover of the Honeywell and National Cash chunks of the business, Control Data looks good for a very long haul. There will need to be printers and readers, no matter what electron beam lithography does to rotating memory.

But that has to remind us of why an NCR or a CDC cannot hope to be counted among the genuine dwarfs – no longer seven, unless we look worldwide and count very optimistically besides – after NFS arrives. To be a genuine dwarf, even a dopey or sleepy or grumpy one, a competitor has to lay out a complete system architecture, sufficiently impressive and sufficiently unique that not only a family of customers but a sizable number of ancillary suppliers will cluster around. Major software packages like Mark IV or Adabas, cheaper compatible peripheral machinery, sexy terminals, and even such minor appurtenances as computer room furniture and ANSI standards must depend on the dwarf initiative.

That, Control Data has openly given up. The decision makes good sense: there is room under the enormous IBM banyan tree for solid services and good accessory gear. Even if the Crays and the Thorntons, or another Amdahl or Joe Watson, were still at work on CDC giants, the R&D investment will be so impossible, post-1976, that a billion-dollar dwarf will be far too small and impoverished to buy in.

And perhaps a little too grumpy, besides. It will never be said of Norris and Cray, not in a hundred computer generations, that after "The captains and the kings depart

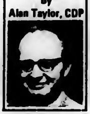
Still stands . . .

An humble and a contrite heart."

Herb Grosch

Precautions a Necessity for Dynamite-Like Data Banks

The Taylor Report
By
Alan Taylor, CDP



Data banks are explosive things, capable of giving good service if properly used and protected but also capable of serious and irreparable abuses.

It seems reasonable, therefore, that the keepers of data banks should assure the world of their capability and understanding of data banks and of the likelihood that they will neither abuse data given to them nor allow others to abuse it.

After all this assurance is required before a license to store dynamite is given to anyone, so why should it not also be required for this modern form of explosive?

The first pieces of data an applicant data bank keeper should supply would, of course, be where he would keep the data and how it would be protected.

Obviously, someone who said he would keep it in open code, so that any temporary employee could access it just by breaking a rule or two, would be turned down immediately.

Computer tapes can so easily be copied. Information once obtained cannot be recaptured. People who don't realize these intrinsic problems of computerized data certainly aren't qualified as data bank keepers.

Disposing of Data

Second is the question of how to dispose of excess data. Data is a dangerous thing to keep lying about. If some sensitive data is around for, say, only the period between one reporting cycle and the next and then is destroyed, that is one thing. But if it is just left around getting dusty "just in case," the data bank operators are taking unnecessary risks.

After the first two fundamental precautions have been dealt with, the next is one that generally people are prepared to talk about – how the data is to be used. Credit-card people often tell us the data is used "to help us get credit." Employers tell us the data is used "to set up personnel files."

Unfortunately, these answers tell us why the data is wanted, not how it is to be used.

What are needed to answer this question are details on methods the data bank people will use and will permit to be used to attain the aims of the data bank – what programs will be written, what processes will be used, etc.

This is similar to requiring the dynamite keeper to give dynamite only to qualified explosive experts who really know how to bring an old factory chimney down neatly and safely.

Merely restricting the use of the dynamite to "bringing chimnies down" does nothing for the safety of the surrounding homes and offices and naturally is not considered sufficient.

Similarly, with data banks it cannot be assumed that even the best aims, in themselves, justify any old way of going about it. Data banks need careful prior analysis if they are to be free from abuse, and that analysis must review any weaknesses implicit in the details of use.

Another question that arises is whether the particular data bank is really necessary. Perhaps the data has to be banked but it may be preferable to bank it elsewhere and let only the proposed data bank keepers have limited access to the processed results (which is all they need often.) Then again, perhaps some or all the information is available elsewhere and should be gathered from there rather than in the way currently suggested.

How Publicized?

Any data bank is capable of being abused, and even the existence of a data bank, if unrealized ahead of time, is thought of as a threat to civil liberties, just as the discovery that someone is storing explosives in the middle of town is thought of as a threat to public safety.

In the case of dynamite, the proposal to store it has to be brought to the particular attention of the people in the neighborhood so that no one has to wonder whether dangerous explosives lie just over the wall.

Similarly, a new data bank would be expected to give notice to the people on whom data is to be included in sufficient time for them to object.

If this is thought to be too onerous, the proposed operators of the data bank should explain who has been told about the data bank and whether they agree with its operations.

Finally, the data bank would have to be supervised during its operation. Books would have to be kept, inspections carried out, accuracy appeals reviewed, failures reported and examined, etc.

The decision to go ahead with a data bank is reasonable if it is to be properly supervised and unreasonable if it is not.

So here again is data which is needed from the proposed operators of a data bank.

Just how necessary it is to introduce some set of standards for the information about proposed data bank operators can be seen from the Jan. 11 meeting of the Baltimore and Washington, D.C., Data Processing Medical Users Group.

Here it was discovered that hardly any of the Maryland hospitals represented were aware that a state commission, the Health Services Cost Review Commission (HSCRC), was proposing to demand every in-patient's Social Security number, the Social Security numbers of his "legally responsible" doctors and surgeons, together with lots and lots of other medical information.

This was done without giving the hospitals or the patients any real information about what HSCRC is going to do with the material.

In fact, as John Brooks of the commission staff told me, it intends to send the material to the Federal government computers at the National Institute of Health.

However, neither that information nor anything else that was really relevant was included in the obscure Dec. 10 notice published in the *Maryland Register.* Nor is any public hearing necessary before these rules become effective April 1.

If you have any suggestions as to how such developing data bases should be controlled, I would be very pleased to hear about them. In the meantime, I certainly think the Maryland HSCRC should delay its data base implementation until information is released and reviewed by an impartial authority and by the public.

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Poor-Quality Programs a Problem

Weak Link in DP Chain Not the Data Entry Operators

By Carolyn M. Dunning
Special to Computerworld

I was very distressed to read "Psychology Reduces Data Entry [Dec. 17] and cannot believe *Computerworld* would print such an unprofessional commentary. Anyone who attacks the integrity of an entire occupation is stupid and uninformed and should never be allowed to make his prejudices and biases public.

My qualifications for challenging this commentary include nearly 10 years in keypunch, both at the operator and supervisory level. Another 10 years has been spent in related areas, such as assisting in the design of a buffered keypunch and training operators in the use of this machine.

Currently I am training operators, programmers and analysts in the use of a key-to-disk system.

I can agree with Hughes that data entry is the weak link in DP, but this is not because of the quality of the operators. It is primarily the fault of the quality of the source documents and instructions coming into the department.

In some areas, it may also be attributed to a lack of training, since many people feel, as Hughes does, that the data entry operators and supervisors are not very capable individuals and cannot learn easily.

So they are allowed to bumble along, doing what they are told, and, if something out of the ordinary occurs, they do not know what to do. This is especially true with today's more sophisticated key-to-disk systems because few people are really aware of the problems of this type of installation.

Reader Commentary

Where do the real problems of data entry lie? First of all, mainframe programs are written with very little thought as to how the data will be entered. Secondly, documents are not designed to be easy to follow and often the operator must jump all over the source document, from one corner to the other to still another to find the data that is to be keyed. Thirdly, there is usually not much consistency to the instructions for each field to be entered.

Hughes stated that almost all problems can be traced to two factors: "the slowness with which the average keypunch/keytape operator learns" and "the operator's unwillingness to wait until the answer [to a question] is available."

I wonder what the learning curve for Hughes would be if presented with 15 or 20 jobs to enter, each with its own set of instructions. An operator must remember the "rules" for an average of 10 to 15 fields per record for hundreds of jobs that are punched in an average keypunch department. For the average person (not just a keypunch operator), this is quite a task.

Since many data entry installations work more than one shift, often when a question occurs the person to ask is not available. If the job has a deadline, someone must make the decision.

If Hughes would check in the data entry departments of today where key-to-disk is the order of the day, she would probably learn most of the programming is not done by the supervisor or anyone familiar with data entry procedures, but by some programmer whose primary experience with data entry was in school.

Is this the person qualified to write data entry programs? I have seen these programmers write such horrendously bulky and incompetent programs that the operators cringe when they must use them.

Why isn't the data entry supervisor who, contrary to Hughes' belief, is usually more than qualified to program data entry equipment, trained to set up these programs?

As far as moving around during the day, making telephone calls, getting coffee or water or going to the rest room, I wonder if Hughes sits at a desk for hours at a time without getting bored or restless.

Keypunching is a very tedious job and an operator must have these occasional breaks to maintain any type of efficiency.

Grounds for Dismissal

As far as "cheat" tactics, in the departments that I have seen, if an operator is caught doing any of these things, not only is this grounds for instant dismissal, but it would be very difficult finding another job in the same community.

I would also like to know what "study" Hughes was referencing when making the statement regarding the "low education level of the average keypunch/keytape operator and the lack of any feeling of responsibility to the employer or company." When this type of allegation is made, it should be backed with facts.

Was this study from one installation, several installations in the same city or many installations all over the country? I have been in many data entry departments and could never make that type of statement. I have recently talked with several data entry supervisors and found that over 95% of all operators are high school graduates, and many even have some college.

It's true that most full-time operators work because they need the income to help support the family or they are divorced and have children to support. And part-time operators usually do work for the extra income. But do these facts really mean they are any less dedicated to their jobs than any other types of people?

Keypunch operators, like any other people, will normally return what they receive. If they receive respect and courtesy, they will return loyalty and dedication.

Also, my experience shows that approximately 99% of all keypunch operators are female, which makes the remark Hughes made regarding women working to find new boyfriends rather ridiculous.

Dunning is a systems analyst at Pertec Corp.'s Business Systems Division.

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Letters to the Editor

Resolution by ACM On Turchin Applauded

I heartily applaud the Association for Computing Machinery's (ACM) resolution on Valentin Turchin [CW, Dec. 24]. It is imperative that the kind of persecution to which scientists in the Soviet Union (or any other country) are liable for their personal political opinions be spotlighted in every possible way.

Not, as Salton implied, because the ACM resolution in and of itself will have a great deal of weight, but because the Soviet Union is very sensitive to world opinion.

Salton's implication of something "shady" regarding Turchin's membership in ACM or his appointment at Columbia should have been stated clearly and openly — and documented — or withdrawn completely.

Salton suggested that ACM "draw the line" somewhere in speaking out against such injustices since there are so many of them. The point is that we have so many of them because so many of us have failed to cry out against them.

Jack Lass
Bethesda, Md.

Effect Underrated

Responding to the reader commentary of Dec. 24 headlined "ACM Resolution on Soviet DPer an Exercise in Futility" by Gerald Salton, I do not know of Valentin Turchin or of his particular circumstances. I do, however, know of many Soviet scientists who are desperately attempting to leave the Soviet Union.

Those of us who live in the free world simply cannot understand the frustrations or conditions under which these scientists live. They wish to leave the Soviet Union to live in a free society and to use effectively their scientific background and training.

The only hope that these scientists have is that enough outside pressure will be placed on the Soviet Union so that they will be permitted to leave.

Many individuals and organizations throughout the world have done what they could to help the Soviet scientists. That the Association for Computing Machinery (ACM) should do the same is not at all unreasonable nor is it futile.

Whereas no single action will generally have a corresponding result, a sequence of actions, I assure you, will have considerable effect.

The Russians are indeed most concerned about the opinions and attitudes of the intellectuals throughout the world. Accordingly, any resolution by the ACM or other similar organizations may have a major effect. The ACM is not "a few unknown American computer people."

Marshall C. Yovits, Chairman
Deparmtent of Computer and Information Science
The Ohio State University
Columbus, Ohio

A Solved Problem

Alan Taylor did not do his homework in making the claim that "Multiple Mailings [are] One of DP's Unsolved Problems" [CW, Dec. 24].

The state of the art in list maintenance not only includes algorithms for the elimination of duplicates (Taylor's example is readily handled by our system), but also includes:

- Parsing of names (needed to avoid sending letters to Mr. Alan Taylor, CDP ... Dear Mr. Cdp).
- Parsing of addresses (to automatically determine Zip code).
- List selection to include elimination of second mailings to individuals after an initial sample is used.
- Computerized letters with variable insertion.

We are currently working on resolving a problem created by a mailing-list supplier whose data file lists a noted manufacturer of kosher food products as "Manischewitz B Company The*."

Gary Mokotoff
President
Data Universal Corp.
Teaneck, N.J.

B1728 Very Reliable

If I were presently considering converting to a Burroughs Corp. B1728, the article "Downtime Causes Firm to Replace B1728" [CW, Dec. 17] would have caused some serious doubts about the reliability of the system.

However, we installed our B1728 in August 1974, seven months prior to the time William A. Rogers installed his system.

We have found the B1728 to be an extremely reliable system. The capabilities of the system are truly extraordinary for this price range.

I am a little confused by the throughput estimate given by Rogers. If he saw a 65% increase on his System/3 by rewriting his RPG-II program in Cobol, there had to be some other reasons besides the language change.

Now that he has increased his throughput by 65% by reprogramming, he now equals the speed of the B1728 when it was processing the old RPG-II program. I wonder what kind of increase he would see if he ran the new Cobol program on the B1728.

In the next-to-last paragraph, he said, "The Burroughs system was too new, and everything we predicted could happen did happen."

I would conclude Rogers must have been opposed to the installation of the B1728 initially, since his predictions all came true. Need I say more?

Jerry Young
Data Processing Management
Livingston-Graham
El Monte, Calif.

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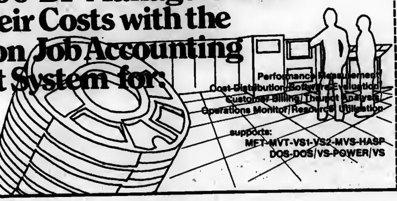

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Random Notes

Document on 'Hypo-Cobol' Now Available From NTIS

SPRINGFIELD, Va. – The language specifications for Hypo-Cobol, described as a "proper subset of the low-intermediate level" of Federal Cobol and outlined recently by the U.S. Navy's ADP Equipment Selection Office [CW, Dec. 24], are now available from the National Technical Information Service (NTIS).

The order number for the 150-page document is ADA018916; the price (payable in advance) is $6.25 for paper text and $2.25 for a microfiche version.

NTIS is at 5285 Port Royal Road, Springfield, Va. 22161.

CICS/VS 'Debug' Card Offered

NEW YORK – Telecommunications Technology Corp. (Teltech) is distributing a "debug" card for use in conjunction with IBM's CICS/VS.

One copy of this programming aid, like the earlier one for non-VS CICS users, is offered free, the company said, and extra copies are available for $2 each.

The multifold, pocket-sized card presents the CICS architecture and provides specific methodology for solving many common problems. Teltech is at Suite 303 East, 200 Park Ave., New York, N.Y. 10017.

Intaractive Adds Data Manager

WALTHAM, Mass. – DXMS, a time-shared data management system said to provide "fully integrated capabilities" from creating and maintaining data bases to producing formatted reports, is now on the Interactive Data Corp. network.

Designed for use with generalized applications, XDMS features a flexible English command language which allows operation by nontechnical personnel.

It also provides the ability to define data characteristics only once and to work with pre-existing files, Interactive said from 486 Totten Pond Road, Waltham, Mass. 02154.

Package Aids Auto Parts Firms

TAMPA, Fla. – Small auto parts firms with access to a Burroughs B700 can run central inventory control for two to 15 stores with a package now available from LXH, Inc., the vendor claimed.

The system, said to run on a 32K B700, has the capacity to manage 27,000 parts with on-hand balances, sales and reorder points. It provides on-line inquiry through CRT terminals concurrently with data entry of sales and inventory receipts.

Management-level reports are also part of the $9,900 system, LXH said from 5445 Mariner Drive, Tampa, Fla. 33609.

Info-Dyne Study Shows

Canadian Network Users Favor RJE

By Don Leavitt
Of the CW Staff

MINNEAPOLIS – Nineteen Canadian companies that heavily utilize remote-computing services spend a median $300,000/year – a mean $400,000/year – with an average of just over four vendors, according to a recent study by Info-Dyne, Inc., a consulting firm based here.

The dollar figures and number of vendors used by each installation were markedly less than comparable figures collected earlier from U.S. users [CW, Oct. 15], Info-Dyne President Richard Sherman noted.

The problem of controlling outside expenditures – just now being recognized by U.S. users – is not a problem for the Canadians. "In general, outside service is reasonably well under control, and a commitment to full dependency on outside vendors is not uncommon," an abstract of the Canadian results said.

Time-sharing coordinators – by one title or another – have been part of the Canadian scene for some time and are generally technically competent people within the user's DP staff, according to Info-Dyne.

In the U.S. study, the people charged with organizing their companies' use of networks had been given that responsibility only recently and were often from outside DP, looking in at net use from essentially a financial aspect, the researcher found.

Important Issue

Economic factors were generally cited by both Canadian and U.S. users as the most important issue in their relationships which vendors, although 25% of the U.S. installations specifically told Info-Dyne it was not "the key issue."

Ranking of other issues differed radically in the two countries. Remote job entry (RJE) capability was far more important to Canadians than to users in the U.S.; this kind of support ranked second in the Canadian list of issues, 10th in the American.

The Canadians in fact linked their first two "issues." Info-Dyne found a "noticeable . . . conviction" on the part of several Canadian users that RJE was "far and away a more cost-effective approach" than interactive time-sharing for the majority of the remote-service activity.

"Technical support" and application programs available from vendors were the next issues most frequently raised.

Here again, Info-Dyne saw a tie-back to the Canadian's careful use of company funds. "The heavy usage of RJE services . . . creates a situation where users are extremely concerned about vendor performance" in these areas, the study said.

Technical support generally centered around local account responsibility, "but headquarters backup and specific expertise" received considerable attention as well. Applications are widely used by this set of users: "The concept that it's cheaper to buy than to build is well established with many users," the report commented.

In the earlier U.S. study, technical support ranked sixth on the list of key issues. Applications available from vendors ranked fourth in the U.S., as it did in Canada.

No other issues were mentioned by a majority of the Canadian users interviewed by Info-Dyne. Time-sharing serv-

(Continued on Page 18)

Operators Gain Real-Time View Of System Problems With 'Look'

PRINCETON, N.J. – The Look system for real-time performance measurement, available now from Applied Data Research, Inc. (ADR), is said to overcome three critical weaknesses of most software monitors currently on the market.

First, Look provides immediate results in the form of console or terminal displays and optional hard-copy printouts for later in-depth analysis; second, the package requires "significantly less" overhead than other systems; and, finally, the system is easy to use and install, the vendor said.

Developed by Progressive Software, Look imposes only a 1% load on the system, which is 1/10th the requirement of most comparable systems, according to ADR.

Intended for IBM OS/MVT, VS1 and VS2 installations, Look's responses can be triggered by a set of commands which can be entered through any operator console, a spokesman claimed.

The commands are used to display summaries of CPU utilization, I/O activity, memory utilization or wait conditions. In addition, for VS-oriented users, the system provides information about paging activity upon command.

Prompt displays of system conditions – instead of after-the-fact reports such as those provided by IBM's SMF – may enable operators to take immediate corrective action, ADR said.

Performance problems such as unexpected high-priority, CPU-bound jobs; channel, device or file contentions; and lost I/O interrupts can all be identified and therefore managed more easily with Look, the vendor added.

Look is licensed at $4,000 per CPU for a permanent license or at $350/mo. ADR is at Route 206 Center CN-8, Princeton, N.J. 08540.

Sharp Runs APL in Batch Mode

TORONTO – I.P. Sharp Associates Ltd. has enhanced the facilities of APL as implemented on its time-sharing network covering North America and much of Europe. The update of Sharp APL is said to allow price reductions of anywhere from 28% to 60% on production systems.

With the enhanced facilities, a spokesman explained, it is possible to use APL in a batch environment, making this version of the language "highly competitive" with standard batch languages such as Cobol, PL/I and Fortran.

Though APL has a reputation of being an esoteric language suitable only for scientific experimentation and highly interactive work, Sharp contended its current packaging allows the language to be used at low cost for routine applications such as accounting runs, mailing systems and linear programming.

Efficiency is based on the design and development of two major components, independent runners and terminal surrogate files. Independent runners are APL tasks which operate without need of an attached remote terminal, the spokesman said.

The terminal surrogate file is a file that contains output which normally would be sent to the attached terminal. This arrangement allows the majority of existing systems to operate in either interactive or batch mode with minimal program modification, he added.

Beyond that, it allows simple design for CRT systems with page recall options, task execution independent of communications noise, spooling of terminal output for subsequent reprocessing and many others, according to Sharp.

The cost reduction stems from the elimination of connection charges, character charges and a reduction of CPU charges, the spokesman noted.

I.P. Sharp Associates is headquartered at 145 King St. West, Toronto, Ont. M5H 1J8.

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More CPUs Gain 'Logik'

CINCINNATI – The Logik systems and data dictionary software, developed by M. Bryce & Associates, Inc. (MBA) to complement the company's Pride design methodology manual, is now available for the Honeywell 6000 and Burroughs medium-scale equipment as well as for IBM shops, an MBA spokesman said recently.

Logik performs traditional data dictionary functions (defining elements and relationships) and adds the capability to automate systems documentation by cataloging entire systems descriptions.

This facility permits system diagnostics to be performed during the design phase, in addition to supporting the logical check of data, records, files and input/output descriptions to avoid omissions and duplications.

A cross-referencing capability between systems and data components allows answers to be obtained in advance to such questions as "What effect will a change have on a system?" and "What components will be affected?" the spokesman noted.

Logik includes a search feature which enables data elements to be defined by both physical and logical attributes, even when the name and number of the element is unknown. Since it is both machine- and file manager-independent, Logik can be used to aid any sort of operating environment, he claimed.

Logik is available for lease for $475/mo or on an unlimited usage basis for $12,000 from MBA at 1248 Springfield Pike, Cincinnati, Ohio 45215.

'DSM' Watches Disk Conditions

ENGLEWOOD, N.J. – A disk space management software package from MHT Services, Inc. is said to perform all periodic maintenance to direct-access storage volumes supported under the IBM OS and VS operating systems.

The Disk Space Manager (DSM), "acting as a trained technician," programmatically monitors disk data set activity, performing required housekeeping and ensuring continued data integrity, according to MHT.

DSM operates in 56K to 76K of main storage on all releases of the OS, SVS and MVS operating systems and supports all currently announced IBM-compatible direct-access storage devices.

The system performs disk-pack backup utilizing IEHDASDR, scratches selected data sets or members of a partitioned data set and dynamically uncatalogs data set names from the system catalog.

It also compresses partitioned data set members when a designated capacity if reached and prepares catalog, VTOC and PDS lists for management, the vendor said.

Through user exit facilities, DSM can be directed to perform its scratch and uncatalog functions based on installation-supplied criteria.

The DSM software package is available on an open-ended license agreement at a one-time charge of $1,475 or on a renewable six-month license agreement at $45/mo. It is available for immediate delivery from 81 Grand Ave., Englewood, N.J. 07631.

Analysts Run Financial Plans With Keypact Unit, Phone Line

ATLANTA – Financial analysts equipped with a briefcase-sized terminal and a normal telephone handset can now access a set of planning programs installed on an IBM 360/25 at the Computone, Inc. data center here.

The Keypact portable terminal was designed for use only with the Computone facilities, the company noted.

In preparation for using the Keypact, the user telephones the center, places the handset in the terminal's acoustic coupler and signals which program is desired.

One of four plastic templates then goes over the unit's rows of switches to identify the meaning of each switch for the program being used, Computone said.

After the user inputs the specific problem through switch settings, the system answers through an audio-response unit and the user transcribes the answer on special forms provided by the company.

Program 093 is a resource allocation and wealth accumulation feasibility study which can show the accumulation for each selected profile of investments, before and after taxes, for any year in the future, the company claimed.

Program 092 is a tool for preretirement counseling that is directly applicable to an individual who has accumulated a sum of money before or at retirement and is deciding what best to do with it, the company said.

Program 095 evaluates the before- and after-tax impact of all types of investments and will apply the sales charges associated with each investment, Computone said.

Program 096 is similar to 095, but can combine the results of a single sum invested and a series of level annual investments in private and/or tax leveraged programs.

The Keypact terminal costs $975 for a basic model or $1,575 for the Executive model. Connect time costs 75 cents/min which includes the cost of the In-Wata phone call.

Compuscan is at 1064 W. Peachtree St. N.W., Atlanta, Ga. 30309.

Canadian Net Users Like RJE: Info-Dyne

(Continued from Page 17)

ice was cited by nearly half the users and that is "much less significant than in the U.S.," where it ranked second among all issues.

"Combined service," the ability to access common files from either time-sharing or RJE units, came next on the Canadian's list, reemphasizing their interest in RJE as a way of doing business on the remote systems.

Of minimal importance to the Canadian users were the areas of specific software requirement, network and physical accessibility and administrative control and security.

"Networks are just not as important to the Canadian user as to his U.S. counterpart," the report found, and "administrative factors are considerably less important, largely [because] services are more under control in Canada."

"Mini-abstracts" of both the Canadian and the U.S. studies are available from Sherman at Info-Dyne, Suite 196, 4600 W. 77 St., Minneapolis, Minn. 55435.

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Course Skips Hands-On Work, Teaches Language Logic

J. Daniel Couger On Education

Can you imagine a course in pistol shooting without the opportunity to fire a pistol? Columbia University offers an introductory course on computer programming without access to a computer.

Reporting on the course at the Marseilles, France International Federation for Information Processing (Ifip) conference on computers in education (and contradicting the conference theme), George Russman and Robert Taylor explained their objective is to make computer knowledge "available to more than the small number of pupils in the world who have access to computer hardware." They created a flowchart language as the learning vehicle for computerless programming.

The language is composed of a small number of statement types; a means for declaring both data items and structure of data; a means for both representing and referencing blocks of code which can be entered, executed and returned from; and the means for indicating three basic types of execution flow: sequential, alternative and repetitive.

The types of statements include internal data assignment, input/output data assignment, conditional (for alternative execution flow), WHILE DO (for repetitive execution flow) and program block references.

Each statement is enclosed in a process box or figure unique to the statement type. The flow of execution is indicated by the order in which the process boxes are connected and by the location and details of each conditional and each WHILE DO within the program or block of code.

The course begins with a discussion of data names, data variables, contents and locations. All discussion of details of internal coding, addressing and data characteristics are deferred until later in the course.

At this point, having gained familiarity and confidence with using the logic of this language to represent problem solutions, students feel motivated to learn such details. Likewise, it is only then that files are introduced "as streams of data which must be programmatically related to item or structure characteristics through exact formal declarations."

Block References

Each block of code must be headed by a block name box and must be terminated by an ENDBLOCK triangle directly below the name box. It can then be referenced and executed whenever a replica of the block name box is encountered in processing any section of code that "knows" that block.

When a block reference is encountered, execution of that block takes place beginning at its top and continuing through until the ENDBLOCK triangle is encountered. Processing then resumes with the next statement immediately below the block reference.

Though this language is simple in construction, the authors believe it is rich enough to allow the composition of well-structured programs and systems of power and size.

"It encourages many of the practices which are constantly commended by supporters of structured programming, modular programming and stylistically 'good' programming. It also encourages novices to think in terms of top-down or iterative refinement as a way to solve problems and compose programs," they said.

Students are given a wide range of problems to solve by flowchart programs. They are required to develop a range of appropriate test data for each program or system before trying to compose any code.

And, though they are encouraged to design the code so its correctness is logically obvious, they are required to "play computer" and execute each program on its predesigned test data.

Simulating the computer this way is only one kind of simulation used extensively in the course. Students simulate the project environment by working in teams throughout the course.

The problem of responding creatively to endlessly shifting user needs is simulated by alternating problem specifications in midstream. It is also simulated by giving a team a completed program (tested and certified by another team) and then requiring the team to modify it to meet new specifications.

Students enjoy the course and emerge with a "far better foundation for further work with computers within the whole human environment of computing than did students from 'real' programming courses [conducted in the past]. We believe the course is good both for those who may become programmers and for those who only want to use computing peripherally or become more literate about this still too mysterious area," Russman and Taylor said.

Perhaps the computerless programming course warrants our consideration.

For additional information, write Taylor at the Center for Computers and Information Management Services, Teachers College, Columbia University, New York, N.Y. 10027.

Couger is professor of computer and management science at the University of Colorado.

Selective Copying, Printing Supported

WICHITA, Kan. – A selective print/copy utility, MMITWO from MMI Software, enables IBM 360/370 systems under OS or OS/VS to copy and reformat Isam and Qsam files.

Reformatting can include a change in block size, MMI noted.

The print capabilities of this $800 package enable the user to select portions of or complete Isam and Qsam data sets to be output. Selection criteria include Boolean algebra options and numeric comparisons.

The firm can be reached through P.O. Box 1399, Wichita, Kan., 67201.

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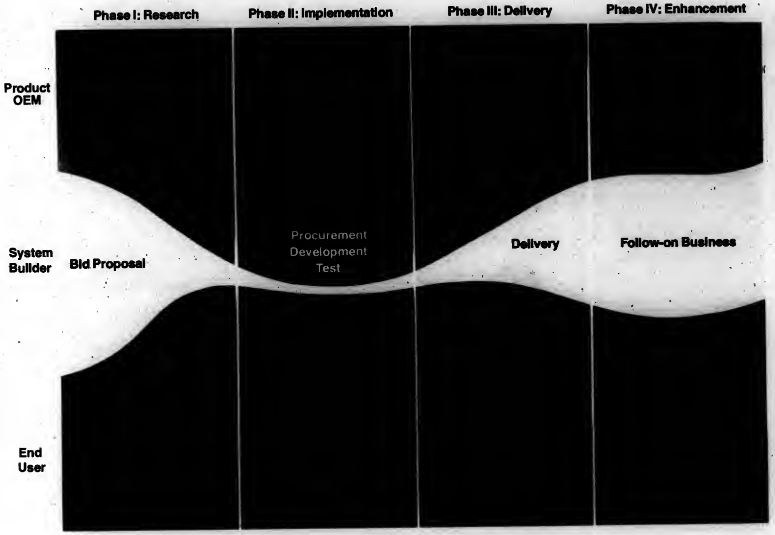

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The System Builder buys computers and peripherals, packages them into a system, adds proprietary software and delivers them to fulfill a specific customer need.

The End User buys a computer system to solve his problem.

Each of these buyers goes through a Computer Life Cycle consisting of four specific Phases—Research, Implementation, Delivery and Enhancement. Interdata responds to the specific needs of the computer buyer during all four Phases of his Computer's Life Cycle.

If you are a Product OEM, System Builder or End User, you might be interested in reading the next page to find out how Interdata can make your job easier.

The following description is the essence of the Interdata concept called Computer Life Support.

Phase I: Research

Computer Life Support begins here. The Product OEM studies his market to determine just what his product should be, where it fits and how much it should cost. The System Builder produces a bid proposal aimed at solving his customer's specific problem. The End User is interested in defining a computer-based solution to a problem and justifying this project to management.

Interdata recognizes that each kind of customer has specific needs during this Phase. Here's how we respond to them.

Product OEM. In studying his market, this customer must gather competitive data, do a ROI analysis, a feasibility study, and—ultimately—determine what products to make or buy.

Interdata makes available cost information over the projected product's life cycle. We will discuss our development plans to help you with your planning. We have field analysts and systems engineers to help with specifications. And we help identify the trade-offs of any make-or-buy decision.

System Builder. This customer needs responsive project and proposal support. He demands a professional relationship with his computer vendors. And he must identify what equipment meets his performance specifications.

At Interdata we format our proposals to your requirements. We offer technical support plus special products and services to fill your needs. And we back this all up with our policy of not competing with our customers.

End User. This customer needs an easy-to-understand computer system. He's interested in near term solutions yielding long term profits. And he must know that his computer can do the job.

Interdata computers have familiar IBM-like architecture supported by thorough documentation. We show you similar applications and provide local benchmark and demonstration facilities.

And, as a subsidiary of Perkin-Elmer, we bring you the resources and financial stability of a multimillion dollar corporation.

Phase II: Implementation

In the Implementation Phase, very similar tasks must be performed by each Interdata customer—be he a Product OEM, System Builder or End User. Each customer must take his computer through procurement, development and testing.

Procurement. The primary need of every customer is an equitable business arrangement with his computer supplier. He must have the proper set of terms and conditions.

Interdata offers the Product OEM a quantity discount agreement; the System Builder a dollar volume agreement; and the End User terms and support tailored specifically for him.

Development. Here all customers want to optimize their design and meet their schedule.

Interdata provides a full family of compatible hardware, software, peripheral and service products so you don't have to start from scratch. We have easy-to-use program development tools like BASIC, FORTRAN, MACRO CAL, COBOL and a multi-terminal development system.

Test. At this point the customer needs to minimize the possibility of system failure.

Interdata provides system debugging and integration aids such as hardware memory protect and privileged instructions.

Net Results. You can benefit from Interdata support during Implementation in three critical areas: Lowest overall price. Optimum computer performance. And on-time systems completion.

Phase III: Delivery

At this Phase of a computer's life cycle, our customers again have distinct tasks: The Product OEM must produce as efficiently and economically as possible. For the System Builder, on-time delivery is critical. And, the End User wants to cutover his system as soon as possible.

Product OEM. This customer wants to minimize recurring product costs. He wants his computer equipment to be reliable and delivered on time. He also wants to increase the value he adds to his product.

Interdata reduces your recurring costs with unbundled hardware and software modules. Our products are reliable because of our conservative design and stringent quality control procedures.

For vertical integration, Interdata sells computer board sets to allow you to increase your value added.

System Builder. To meet delivery requirements, he must have reliable computer equipment backed up by responsive field service.

Interdata's quality control assures you of no on-site surprises. We 100% test all our incoming parts. We put our computers through a unique "shake and bake process." We solve product problems in the factory—rather than in the field.

End User. When cutting over to production, the End User needs service. Accordingly, Interdata provides four field service programs: resident service; contract service with fixed price on parts and labor; on-call service for which we charge for parts and hourly labor; and depot parts maintenance service.

Phase IV: Enhancement

In the final Phase of the computer life cycle, the Product OEM is working to extend his product's life. The System Builder is looking for follow-on business. And the End User wants to expand his system.

Product OEM. This customer's concern is to avoid product obsolescence.

Interdata offers you improved product performance through upward compatibility. Or, you can lower your product's price by taking advantage of the next generation of interdata computers.

System Builder. To capture follow-on business, the System Builder needs to transfer his experience, training and software from one system to the next.

Interdata makes transferability easy because of our familiar, large-machine architecture and complete family compatibility.

End User. For this customer, system enhancement means system expansion.

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Functional Paragraph Names Key to Cobol Clarity

By William B. Simmons

Special to Computerworld

Concepts and Techniques

There is a little-known clause in the Ansi Cobol standard which, if properly used, can do much to enhance program clarity. I am referring to the fact that paragraph names do not have to be unique throughout a program, but only within a section.

An important corollary is that any nonunique paragraph name referred to without qualification is assumed to be within the same section as the referring statement.

In light of these rules, it is often advantageous to use nonunique paragraph names. If this sounds odd, permit me to point out how much of a programmer's time is spent in learning and trying to remember procedure names.

Anything that can be done to reduce the number of *significant* names will make the programmer's task just that much lighter.

There is a technique for doing this and it may be outlined as follows:

1. The program must be designed as a set of logically separate functional routines, each having one entry and one exit. It is very desirable that each should be no more than one page in length.
2. Each functional routine should be coded as a separate function.
3. Transfer of control between routines (sections) should be by a PERFORM statement only. Conversely, only full routines may be PERFORMed, never portions only.
4. A GOTO may only transfer control between points within the same routine.

If these guidelines are followed carefully, it will be seen only the function names (i.e., section names) need be unique. Paragraph names will be needed only where the language syntax requires a named branch point.

Being purely internal to the routine, these require no qualification and may even duplicate names in other routines. Since all references occur within the same page, the names themselves can be quite trivial.

The accompanying illustration demonstrates two types of internal branch points: the named exit and the in-line loop. Note that there is no need to derive the exit name from the routine name; also, the name used can be a standard name, common to every routine in the program.

This works because the statement "GOTO END-SEC" is always interpreted by the compiler to mean "exit immediately from *this* routine." In the case of the loop, the name used is very trivial, but its meaning is immediately apparent from the context. It, too, may be duplicated in other routines.

The point I am trying to emphasize is that a distinction can be made between function names and the branch point names within a given functional routine. The former must be unique and as meaningful as possible; the latter need be unique only within the routine and may be trivial.

```
000010/
000020 CALC-FACTORIAL SECTION.
000030*
000040*     CALCULATES THE FACTORIAL OF A GIVEN NUMBER.
000050*
000060*     DATA FIELDS (ALL 8-DIGIT NUMERIC INTEGER)
000070*
000080*         ARGUMENT  -- GIVEN NUMBER
000090*         WORK-MULT -- MULTIPLIER AND LOOP COUNTER
000100*         FACTORIAL -- RESULT FIELD
000110*
000120
000130     IF ARGUMENT NEGATIVE
000140         PERFORM NEG-ARG-ERROR
000150         MOVE ZERO               TO FACTORIAL
000160         GO TO END-SEC.
000170
000180     IF ARGUMENT = ZERO OR 1
000190         MOVE 1                  TO FACTORIAL
000200         GO TO END-SEC.
000210
000220     MOVE ARGUMENT               TO FACTORIAL.
000230     MOVE ARGUMENT               TO WORK-MULT.
000240     SUBTRACT 1                  FROM WORK-MULT.
000250
000260   LOOP.
000270     MULTIPLY FACTORIAL          BY WORK-MULT.
000280     SUBTRACT 1                  FROM WORK-MULT.
000290     IF WORK-MULT > ZERO
000300         GO TO LOOP.
000310
000320 END-SEC.
000330     EXIT.
```

Reason to Hope

There is reason to hope Cobol will be improved to permit "pure" structured coding. An in-line PERFORM, an END statement, etc. would eliminate the need for many internal branch point names. Until then, however, the techniques described here will be a useful means of improving program clarity.

At this point it would be wise to add a cautionary note. This technique will not work with subset compilers which contain only Level 1 of the Nucleus. This permits no qualification and all procedure names must be unique.

But the user of a Level 1 Nucleus has many more problems to worry about than this.

Another problem is that new habits are never acquired without effort. The proper use of nonunique paragraph names absolutely requires a functional approach to program design. This is often a greater hurdle for the programmer than the change in naming conventions.

I can only hope programmers will not let initial difficulties dissuade them from learning this technique. Once mastered, it does help reduce the proliferation of procedure names that can often make a program next to unreadable.

As any programmer knows, that's no small thing for which to be thankful.

Simmons is an independent DP consultant in Montreal.

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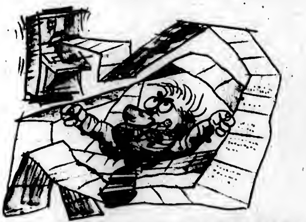

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In Datapro User Survey

Independents' Modems Score Higher Than Bell's, IBM's

By John Hebert
Of the CW Staff

DELRAN, N.J. – IBM and Bell System modem equipment ratings were lower than those of data communications modems of six independent vendors in a recent user survey.

This finding was reported in "All About Modems," a 44-page report from Datapro Research Corp. here.

Ratings on 280 data communications modems from 48 vendors were given by 411 users with a combined base of 11,820 units, giving 960 individual responses on a scale of 1 (poor) to 4 (excellent), Datapro said.

Users of General Datacomm Industries, Inc. and Comdata Corp. modems gave the highest grades in the overall performance category with weighted average ratings of 3.9.

Gandalf Data Communications Ltd., Paradyne Corp. and General Electric Co. (GE) modems were each awarded an overall performance rating of 3.8, the report said.

International Communications Corp. (ICC)/Milgo held the sixth highest position in performance with an evaluation of 3.6, according to the report.

Besides rating overall performance, users responding to the survey evaluated modems for hardware reliability, maintenance service and diagnostic facilities and listed data transmission rates and number of each vendor's devices in use, the company said.

Users were also questioned on types of features used, major difficulties encountered and type of communications facilities and carrier usage, the report said.

In the area of hardware reliability, Gandalf's modems earned a flawless rating of 4, with Comdata Corp. not far behind with a 3.9 and GE and Paradyne following with a rating of 3.7, the report said.

Timeplex, Inc. and Anderson Jacobson, Inc. were next with scores of 3.6, and IBM, Bell and Univac modems, among others, were given scores of 3.5, it noted.

Users were not as satisfied with vendor maintenance and service. Highest ratings went to Comdata with a weighted average of 3.7. Gandalf and MI^2 Data Systems, Inc. earned a 3.5 rating; Timeplex, a 3.4; IBM, a 3.3; and Bell, GE, ICC/Milgo, Paradyne and Vadic Corp. earned a 3.2, the report said.

Low ratings were given to equipment diagnostic capability (2.7 overall). This may be because capabilities are not widely available or because users have the attitude that, since they are paying for equipment and service, the vendors may as well repair any problems, the report noted.

Users listed phone line troubles as their major communications difficulty, dividing problem causes between line quality and line outages, which gathered 26.1% and 19.1%, respectively, of total user responses, the report noted.

Dial-up communications facilities were used by 419 users surveyed or 43.6% of the total response, it added.

Unconditioned voice-grade private lines accounted for 31.3% of facility usage with 300 user responses and, of the conditioned lines, C2 conditioning accounted for 17% of the responses.

The Bell System was the most widely used carrier with 819 of the 960 individual responses or 85.3%, the report said.

Western Union, Inc. has 1.4% of user response with 13 users, MCI Communications Corp. had 15 users or 1.6%, Data Transmission Corp. had seven users or .7% and Southern Pacific Communications Corp. had 3 users or .3% of the total response, the report said.

Operating speeds in the 2,000- to 2,400 bit/sec category were used by 30.4% of respondents; transmission speed of 4,800 bit/sec was second, used by 25.3%; and operating speeds between 0- and 300 bit/sec were next with 19.5% of the responses, the report said..

Data transmission rate of 3,600 bit/sec was next with only 11 user responses or 1.1%, it added.

Users of Bell System modems were the largest group with 4,376 units out of the total of 11,820.

ICC/Milgo captured second place with 1,133 installed units, and Penril Data Communications, Inc.; IBM; Rixon, Inc.; and General Datacomm took the next four positions with 800; 669, 640 and 583 modems in use, respectively.

The report is available for $10 from Datapro at 1805 Underwood Blvd. in Delran, N.J. 08075.

System Monitors Bank's Federal Reserve Position

NEW YORK – Each day at Chase Manhattan Bank, N.A., the staff of the Reserve Position Department handles the monitoring of $30 billion in funds and $5 billion in securities transfer transactions.

To help the staff do the job, the bank has installed a communications system which automates the bank's monitoring of all transfers – some $12 billion daily – via Fedwire, the Federal Reserve Bank's communications network. Of the 5,000-plus transactions daily on Fedwire, 85% are funds transfers and 15% are securities transfers.

The system, called the Reserve Position Accumulator (RPA) system, was designed by Western Union Banking Systems, a Western Union Teleprocessing division located in Mahwah, N.J.

In operation since early last January, the RPA system automatically captures each Fedwire transaction as it is sent or received by the bank and accumulates incoming and outgoing totals so that the Reserve Position Department staff can monitor the bank's current balance with the Federal Reserve Bank.

The RPA system includes a Digital Equipment PDP-11/35 with RK05 removable disks, TU 10 tape unit and teletypewriter console. Also included is a DEC DH 11 line multiplexer which monitors the Fedwire low-speed circuits.

The low-speed lines operate at 150 bit/sec on a private line network to monitor the transactions on the banking system. The RPA system actually bridges the Fedwire lines to accumulate data on all transactions related to Chase Manhattan daily operations.

The daily report generated by the RPA system is printed out on 10 Western Union Data Services EDT 1200 terminals to keep bank personnel up to date on the bank's Federal Reserve position at all times.

The terminals operate with Bell 202 modems and data is sent between the processor and the terminals over the phone system even though each terminal is physically in the same bank building, a Data Services spokesman said.

The software for the specialized banking system was developed by Western Union Data Services and the system was designed for the bank on a turnkey basis.

More Accurate Forecasting

One of the largest benefits of using RPA, according to James Hopes, vice-president of the Money Transfer Division at Chase Manhattan, is that the system, by providing an accurate and timely flow of information on federal funds, will save the bank at least $150,000 annually through more accurate forecasting.

Previously the Fedwire data was accumulated manually.

With accurate information on the Federal Reserve position, the bank's officers can do several things more effectively now than had been possible before RPA. This includes the buying and selling of federal funds with other banks. Knowing up-to-the-minute what the bank's total monies are helps Chase Manhattan avoid the flurry of trading that occurs between banks when they discover they have either excess funds or not enough funds and are trying to find them to meet the bank's reserve requirement.

Hopes said that, before automation, the manual monitoring system, as with any manual system, had within it the possibilities for human error.

One error through one transposition can cause the bank the loss of the use of those funds for a day. It could also result in a heavy dollar penalty from the Federal Reserve.

"Before installing RPA, the staff had to manually accumulate and double-check all funds transfers and all securities transfers," Hopes said.

The bank has reduced errors with the Federal Reserve by 50% by using the RPA system, he said.

Feature Allows APL Interaction For IBM 3270 Display System

WHITE PLAINS, N.Y. – IBM has introduced the Data Analysis-APL enhancement for the 3270 display system. The interactive hardware feature allows users to interact with APL programs.

The feature is field-installable and operates under VS APL and Virtual Storage Personal Computing (VSPC) [CW, Jan. 12]. It can also operate under VM/370.

The feature allows all 133 APL characters to be entered and displayed on the 3277 Model 2 screen. The APL character set located in the upper-case position is used by pressing the APL on/off key.

The Data Analysis-APL feature costs $30/mo for the display station or $600 purchase. The control unit is $50/mo or $750 purchase. A 66-key APL keyboard is $31/mo or $961, while a 78-key keyboard is $48/mo or $1,490.

The 3284 Model 2 and 3286 Model 2 printers can be attached to the 3270 display system to provide copies of the APL data on the screen. This feature in either printer costs $50/mo or $1,650.

IBM also introduced two field-installable no-charge features related to APL. The first is a VS APL Assist feature for the 370 models 135 and 145 which is said to provide improved interpreting and executing of APL statements.

The second is an APL graphics character set for the 3767 terminal for operation under Synchronous Data Link Control.

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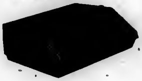
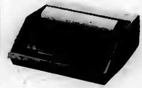
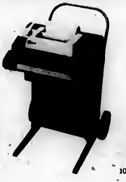
(left) *AJ 830*, the *new* 30 cps impact printer terminal which features quality and reliability—plotting, too.
(below) *AJ 841*, the rugged Selectronic™ printer terminal. A cost effective replacement for the IBM 2741.



(right) *AJ 230*, a mobile acoustic Teletype terminal. (Also available in auto-answer TWX/DDD versions).
(below) *AJ 630*, a 30 cps quiet, non-impact printer terminal with 140 character print line. (APL is an option.)





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Networking Package SDLC-Based

ANAHEIM, Calif. – A hardware and software package for computer network architecture based on the Synchronous Data Link Communications (SDLC) protocol has been introduced by General Automation, Inc. (GA).

The networking package includes the 1575 Synchronous Data Link multiplexer, a direct memory access (DMA) full-duplex 16-line facility; the 1578 SDLC controller, single-line programmed I/O facility for the GA SPC-16 or Solution Series Computers, the 1579 SDLC controller, a single-line full-duplex DMA facility for SPC-16 or Solution Series computers; and an SDLC software array that provides the user with building blocks to configure a computer network.

The 1575 Synchronous Data Link multiplexer, a 16-line DMA communications facility capable of full- or half-duplex operation, can be used in a front-end processor to support communications to multiple satellite nodes, in a remote controller or concentrator with a minicomputer or microcomputer or in a standalone module in a network, GA said.

The 1575 provides data transfer rates of 9,600 bit/sec on data service units, RS-232 or Bell modems.

Other features include internal or external clocking, automatic framing of transmissions, integral data checking and transparent operation. The 1575 costs $11,500 for a 16-line system.

The 1578 SDLC controller is a means of interfacing SPC-16 or Solution Series computers to SDLC terminals. This buffered full-duplex device operates at up to 9,600 bit/sec.

The 1578 is compatible with Bell RS-232 data sets and costs $800.

The 1579 SDLC controller provides a DMA facility for communicating between SPC-16 and Solution Series processors at rates up to 2.5 MHz, as well as 9,600 bit/sec and 56 bit/sec. Designed for full-duplex operation, the 1579 provides automatic generation and checking of SDLC frame-checking sequence, the firm said. The 1579 costs $3,000.

The SDLC software package provides multipoint and point-to-point capabilities with various modes of operation including primary station to primary station.

The hardware is available in 30 days. System capability with hardware and software is available in 90 days from 1055 S. East St., Anaheim, Calif. 92805.

Micro-Based Multiplexer Handles Mixed Channels

EL SEGUNDO, Calif. – A microprocessor-based multiplexer from Computer Transmission Corp. (Tran) accommodates up to 16 asynchronous data channels, eight synchronous digital data channels or a mix of both.

Intended for a simple point-to-point multiplexing between terminal clusters and computer centers, the M1308 Multitran multiplexer supports wide mixes of remote job entry terminals, synchronous CRT controllers and interactive asynchronous terminals over a single voice-grade telephone line, a company spokesman said.

The M1308 can connect terminals via dial-up or dedicated modems, Tran short-haul data sets or direct EIA cabling.

Providing a multiplexing capability for small- to medium-size network users, the M1308 contains a programmable microprocessor. This programmability makes possible format compatibility with Tran's other network products such as the M1100 series multiplexers, M3000 Network Management switches and M3200 Pacuit networks, all of which are intended for large network users.

Programming is said to make the multiplexer flexible because a program loaded into the microprocessor meets synchronous and asynchronous channel allocation needs.

The byte-interleaved, time-division multiplexer can handle asynchronous inputs at standard rates of 75-, 110-, 134.5-, 150-, 300-, 600- and 1,200 bit/sec on either private or dial-up lines. It also can accommodate synchronous input speeds of 1,200-, 2,400-, 3,600- and 4,800 bit/sec.

Automatic speed recognition or Autobaud, an optional feature, eliminates the need for dedicating asynchronous channels to specific transmission speeds, the spokesman said.

Three Models

Three M1308 models offer different performance features and costs. The basic M1308, an asynchronous time-division multiplexer, comes with an RS-232/V.24 high-speed trunk interface for up to 9,600 bit/sec transmission, a chassis with eight low-speed interface positions and a cabinet and power supply.

The Model M1308-1 multiplexer adds Autobaud automatic speed recognition to the basic unit; the Model M1308-2 adds synchronous terminal support to the M1308-1.

Three optional EIA RS-232C/V.24 interface modules are available. The one-channel synchronous Model M1396, priced at $450, provides four visual indicators of the control functions, Send Data, Receive Data, Busy and Data Set Ready/Data Terminal Ready, plus a diagnostics capability consisting of a Busy switch to busy-out the channel and do remote loopback testing.

The two-channel Model 1399, priced at $300, provides the same functions as the Model 1396 module, but interfaces with asynchronous equipment; the two-channel asynchronous Model M1399-1, priced at $260, provides only the four control function visual indicators.

The basic M1308 costs $1,800; the M1308-1, $2,000; and the M1308-2, $2,250. A basic 16-channel point-to-point multiplexing network between a terinal cluster and a computer center costs "less than $8,000," the company said from 2352 Utah Ave., El Segundo, Caif. 90245.

Syntech Rate Selector Lets Modems Adapt to Different Bell Data Sets

ROCKVILLE, Md. – Syntech Corp. has developed the Auto Data Rate Selector (ADRS), an automatic control device which allows Syntech modems operating on the dial network to adapt and automatically switch compatibility with a Bell 201A, 201B or 201C data set.

This device operates at a CPU which handles data from combinations of 201A, B and C modems and allows one modem to handle calls from all three of 201 units.

The ADRS analyzes signals received on-line from a remote source modem, generates the appropriate command and locks in to the desired compatibility mode if the call is either originated from or answered by the ADRS equipped modem, Syntech said.

Origination/answer can be either manual or automatic, and the ADRS will adapt to each new call regardless of whether the calling party or the called party initiates the data "handshaking" or polling.

The ADRS operates with Syntech 201 modems which are capable of accepting an external command that switches the data rate from 2,000- to 2,400 bit/sec.

Priced at $250 on 30-day delivery, lease plans are also available for the ADRS, Syntech said from 11810 Parklawn Drive, Rockville, Md. 20852.

Datatrol Installs First POS System

ROCHESTER, N.Y. – Datatrol, Inc. and Associated Dry Goods Corp. have installed the first Datatrol point-of-sale (POS) system at Sibley, Lindsay and Curr.

Four hundred and fifty POS terminals are operating in the downtown store here and nine branch stores in the Rochester and Syracuse areas.

The system, designated RS-6000, comprises modular POS terminals, in-store controllers and a central minicomputer system.

Datatrol, Inc. is at Kane Industrial Drive, Hudson, Mass. 01749.

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Panasonic Model S CRT Eases Payrolls of Multisite Employers

SECAUCUS, N.J. – The Panasonic Co. has a data entry terminal designed for the collection and data transmission of time and attendance data for employers whose work force is spread over a multiplicity of locations.

The Model S will allow such users as retail department stores and supermarkets to transcend distance, time and central control difficulties in payroll administration, Panasonic said.

The operation requires the manual insertion of a punched identification badge into the terminal by the employee and its extraction when the "Pull Card" light illuminates.

The transaction reportedly takes 182 µsec and eliminates the need for time cards, reconciliation, balancing or arithmetic by supervisors or timekeepers. The on-site supervisor can check the capacity of the machine through a memory gauge on the face of the terminal.

Transmission of data to an RS-232C unit such as a low-speed teleprinter is usually part of the system.

Terminal Transactions

The Model S has an output transmission rate selectable from 110- to 9,600 bit/sec and a memory module. It costs about $3,000 with 60-day delivery from One Panasonic Way, Secaucus, N.J. 07094.

Sanders 'GSS' Allows Graphics on SA 500

NASHUA, N.H. – Sanders Associates, Inc. has introduced a software package, the Graphic Support Software (GSS-3), which enables users with Fortran to create and manipulate graphic images on Sanders SA 500 interactive display systems.

The SA 500 is a computer-driven graphic display system which transforms and formats dynamic digital information for presentation on CRT terminals. The display can be controlled by the operator.

With GSS-3, the SA 500 becomes a stand-alone system with applications and graphic systems software.

GSS-3 is a Fortran-callable subroutine package which facilitates the use of the SA 500 as an I/O device. CRT images are presented to the operator, who may interact with the system using any of several input devices.

The major functions of the GSS-3 include allowing the application programmer to organize display information into independent "pages;" a Teletype simulator at each operator station for keyboard input; and a "Mark" within pages so the application programmer can perform random-access updates to displayed information.

The minimum SA 500 system configuration for GSS-3 is a display generator with page register option, display processor (Digital Equipment Corp. PDP-11) with 24K core and the extended instruction set, display indicator (keyboard, light pen, trackball or joystick optional), disk cartridge control and drive, teletypewriter, bootstrap loader, clock, RSX-11M operating system and a second disk drive, magnetic tape, DEC tape or cassette.

Applications for the SA 500 include simulation and training, automated mapping and drafting, computer-aided design, command and control, air traffic control, curve plotting and network flow analysis.

GSS-3 is priced at $1,000, Sanders said from Daniel Webster Highway South, Nashua, N.H. 03060.

NBS Revises Instructions For Implementing Ascii

WASHINGTON, D.C. – The National Bureau of Standards (NBS) has revised the instructions for implementing the American Standard Code for Information Interchange (Ascii) in federal computer and telecommunications applications.

These instructions, when approved by the Secretary of Commerce, will establish within the government a common code and collating sequence for the exchange and processing of data and programs recorded in character form.

A copy of the proposed revised standard, Fips Publication 1-1, is available from the NBS Office of ADP Standards Management, Washington, D.C. 20234.

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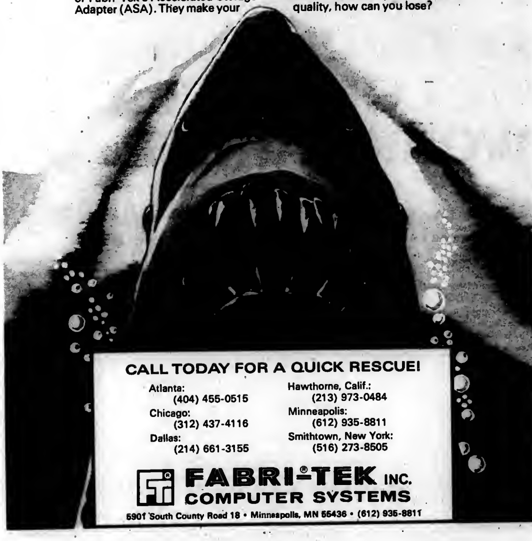

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Bits & Pieces

STC Links Super Disks, 8100 Drive to IBM 360/65

LOUISVILLE, Colo. – Storage Technology Corp. (STC) has interfaced its models 8400 and 8800 Super Disks to the IBM 360/65.

The firm has also interfaced its Model 8100 3330-I-equivalent drive to the IBM machine.

STC previously offered the 400M-byte and 800M-byte fixed disk drive systems for the IBM 360/90, plus 370 models from the 135 on up.

STC interfaced the Super Disk line to the 360/65 chiefly by simulating the 370 command retry function with microcode and an operating system software module.

Deliveries to 360/65 users will begin next month from the firm at 2270 S. 88th St., Louisville, Colo. 80027.

IGC Plans Meeting on Printers

ANDOVER, Mass. – "Compuler Printers: Trends for the Future" will be the topic of a conference to be held at the Andover Inn here on Feb. 22-24 by the Institute for Graphic Communication, Inc.

The conference, intended for both users and vendors, will include sessions on formed character printers, matrix impact printers and impactless printers as well as "An Overview of Computer Printing" and "Characteristics and Applications for the IBM 3800."

Further information is available from Richard D. Murray, Director of Conferences, IGC, 375 Commonwealth Ave., Boston, Mass. 02115.

Guide Compares Architectures

PENNSAUKEN, N.J. – The *Auerbach Guide to International Computer Systems Architecture* provides comparison information in a single volume on all the major general-purpose computer systems in the world, Auerbach said.

The guide categorizes and discusses the basic architecture types used in today's CPUs.

The architectures' "strengths and weaknesses in specific environments, such as their suitability or handicaps in virtual memory, data communications or distributed processing, are presented," Auerbach said,

The guide also presents a graphic representation of data flow for every major general-purpose computer from American, British, French, German and Japanese manufacturers.

The 95-page guide costs $24.95 from Auerbach Publishers, Inc. at 6560 N. Park Drive, Pennsauken, N.J. 08109.

Yale DP Center Finds

Price Not Only Factor in Memory Search

By Patrick Ward
Of the CW Staff

NEW HAVEN, Conn. – When the Yale University computer center looked at independent vendors' add-on memory for its 2M-byte IBM 370/158, it found it had to carry the evaluation beyond the price of the memory alone.

One result of the search is that the monthly maintenance cost of the Intel memory the computer center chose is about one-tenth what another vendor proposed, according to Greydon Freeman, director of the center.

The computer center, which is the academic and research computing facility for the university, wanted to move to IBM's Multiple Virtual Storage (MVS) to provide more apparent core and some added functions for its time-sharing users.

The computer center had benchmarked MVS on the 2M-byte machine and found its performance was "intolerable for our operating environment," Freeman said.

The solution was to add more memory to the purchased CPU, but the cost of another 1M byte from IBM was "prohibitive," he said.

The computer center then decided to look at what the independent vendors could offer. Advanced Memory Systems, Inc. (AMS), Intel Corp., National Semiconductor Corp. and Cambridge Memories, Inc. (CMI) each arranged either plant or site visits to demonstrate their products..

The computer center also checked with users of the four vendors' memory.

"All the vendors made a product which looked like it would operate satisfactorily and require little maintenance," Freeman said.

But "if you put all the statistics about the four vendors' products down on paper, none of them jumped off the paper and said 'Buy me,' " he remarked.

And "while price was, of course, important, all of the vendors made essentially the same offer," Freeman said..

Subjective Judgments

The computer center was left with making subjective judgments about which vendor's memory to buy.

"What we tried to do then was to look at the implications of the technology. Some had 1K chips and some had 4K. Was there any particular advantage either way?

"We didn't feel there was," Freeman said.

"The 1K is faster and gives more flexibility in attachment to the CPU, but the 4K uses less power," he observed.

Maintenance service was also hard to judge, "It depends so much on the local personnel," he remarked.

The computer center made an effort to determine the "care and feeding" costs of the different memory choices, and here differences finally began to emerge.

(Continued on Page 30)

Compuscan Hand-Held OCR Unit Scans at Up to 150 Char./Sec

By Nancy French
Of the CW Staff

TETERBORO, N.J. – Compuscan, Inc. has introduced a 9-oz. hand-held optical character recognition (OCR) unit that can read two or more fonts of full numeric or alphanumeric character sets.

The Datawand can read selectively from stocks, bonds, invoices, name and address lists or almost any field of text from any size document, a spokesman said.

Normally interfaced to a key-entry terminal, the Datawand scans data at rates up to 150 char./sec. It can display nonscannable data either on the key-entry terminal's CRT screen or on a display unit furnished by Compuscan.

The device consists of a scanner mounted on a slide frame and connected by a cable to a suitcase-size recognition unit, the firm said.

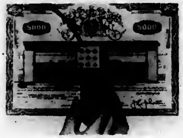
The operator frames the data to be read in the instrument's window, presses the enable button and moves the wand over the text. The Datawand will also follow a skewed line, Compuscan noted.

Datawand can read any alphanumeric OCR font, such as OCR-A or OCR-B, up to four switch-selectable numeric fonts in the same wand or a full alphanumeric font plus any additional numeric font.

It can be connected to a terminal with no software impact; to the terminal, the data appears to be coming from its own keyboard but at a faster than usual rate, the spokesman said.

The Datawand reads and compares each character image with the internally stored library of characters. When an input character matches with sufficient precision, an identification code (usually Ascii) is stored, the firm said.

If the match is poor, the recognition unit will store a blinking question mark to allow editing. When the entire line is scanned the recognition unit analyzes the stored characters, allows editing of questioned characters and validates and formats the data.


Compuscan Datawand

(Continued on Page 30)

Omnus Controller Runs 3330-IIs On Univac 1110, 490 Series

By Patrick Ward
Of the CW Staff

SANTA ANA, Calif. – Omnus Computer Corp.'s plug-compatible, programmable disk controllers for the Univac 1100 and 490 computer series can support IBM 3330-II-equivalent disk drives on the Univac systems, Omnus said.

A disk subsystem with the Omnus controller and 3330-II-equivalent with drives costs about 40% less than the Univac product, according to Omnus.

Users of the standard Univac 8460 disk controller have to wait for the release of that company's Level 33 software to interface 3330-equivalent drives, Omnus said, adding Univac has not announced 3330 support for the 490 series.

The Omnus dual-channel disk controller interfaces to two Univac I/O channels on one or more processors through the standard Univac operating system's Fastrand or 8460 disk handlers, a spokesman explained.

The controller supports 12 of the 3330-II equivalents under 8460 emulation and can support eight of the disks under Fastrand. With the debut of Level 33 software, the controller will be able to support 16 of the drives, Omnus said.

The controller provides error correction and on-line and off-line diagnostics. In addition, it offers a 32K buffer to protect against overrun errors when the Univac CPU is heavily loaded.

(Continued on Page 30)

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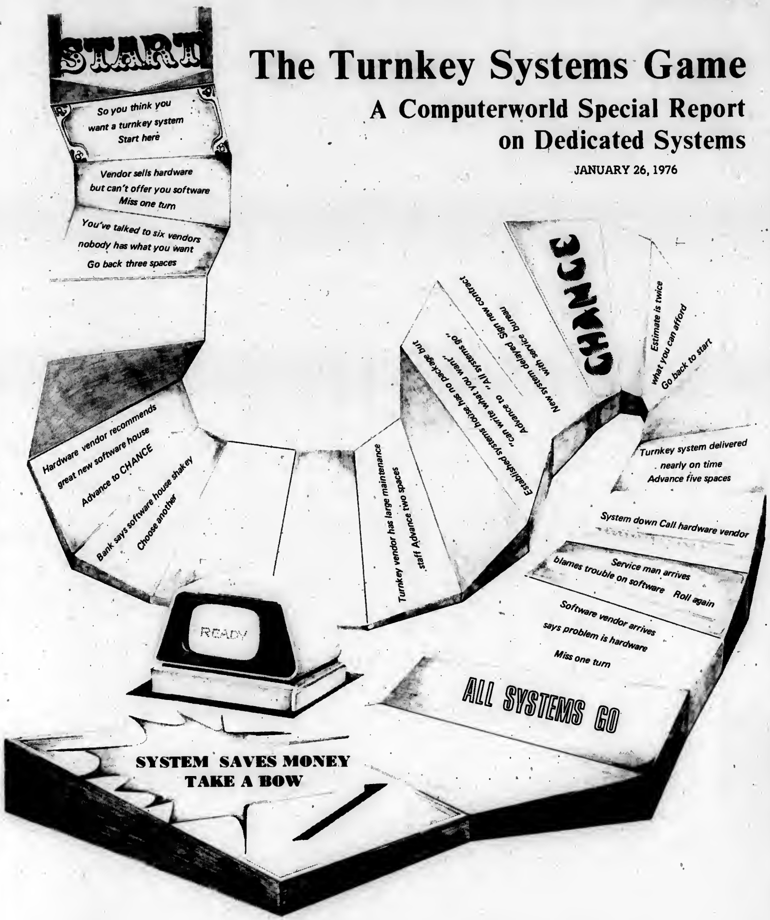
The Turnkey Systems Game

A Computerworld Special Report on Dedicated Systems

JANUARY 26, 1976


START
So you think you want a turnkey system Start here
Vendor sells hardware but can't offer you software Miss one turn
You've talked to six vendors nobody has what you want Go back three spaces
Hardware vendor recommends great new software house Advance to CHANCE
Bank says software house shakey Choose another
Turnkey vendor has large maintenance staff Advance two spaces
Established systems house has no package but "can write what you want." Advance to "All systems go."
New system delayed Sign new contract with service bureau
CHANCE
Estimate is twice what you can afford Go back to start
Turnkey system delivered nearly on time Advance five spaces
System down Call hardware vendor
Service man arrives blames trouble on software Roll again
Software vendor arrives says problem is hardware Miss one turn
ALL SYSTEMS GO
READY
SYSTEM SAVES MONEY TAKE A BOW

Term 'Mini' Vague Also

Defining 'Turnkey Vendor' Worthy of Shakespeare

By Leonard Farano
Special to Computerworld

Are you about to suffer the slings and arrows of outrageous fortune associated with installing a minicomputer system? Or are you thinking about being less noble in the mind and employing a turnkey system vendor to perform the task?

And does the latter decision make the fortune any less outrageous?

If you are a first-time mini user, the respective answers to the above questions should be "no," "yes" and "Dear God, I hope so!"

Since it no longer is possible to define what a mini is because of the enormous range of types, sizes, capacities and capabilities now being offered under that term, perhaps I can define what it is usually not.

In most cases it is not marketed by a manufacturer who provides the same cradle-to-grave support we have become accustomed to expect from large manufacturers. (I said expect, didn't I?)

It is usually not rented, but acquired through a purchase or lease/purchase. The equipment cost for the entire system normally is not outside the $15,000 to $100,000 range, with $40,000 being the norm.

It is not usually marketed by a vendor who has manufactured all the components of the system. In fact, the vendor may have manufactured none of the components and may not even be a manufacturer. It is not always serviced and maintained by the vendor who markets and/or manufactures the equipment.

It does not normally require extensive space and/or air conditioning and electrical requirements. This does not mean it will work effectively when housed in a telephone booth in Death Valley connected to two dry-cell batteries.

The minicomputer does not normally require DP personnel to operate and, in fact, its operation should be reasonably transparent to the user. Its manufacturers do not usually provide application software.

Having now defined what mini manufacturers are by describing what they are not, let us proceed to the definition of a turnkey systems vendor.

The simplest definition is that a turnkey systems vendor is one that should provide the total hardware and software systems solution to the users requirements at a minimal cost, with the solution available immediately upon installation.

Are turnkey systems vendors unique to minicomputers? Not really. One could argue that the large mainframe manufacturers in the before-unbundling days ofttimes provided a turnkey approach. In fact, some of those same manufacturers who have remained bundled still do.

A further argument could be made for large system houses who deliver complete and immediately usable application software on large mainframes.

However, in the case of the latter, the contracts rarely involve the sale of hardware in the package. In the case of the former, most users of large mainframes have in-house systems and programming staffs who develop the application software.

So, while turnkey systems vendors are not unique to minicomputers, the vast majority of those fitting our simple definition are, in fact, installing minicomputers.

Let us now examine the simple definition more closely in terms of the many different types of arrangements made with firms providing or claiming to provide "turnkey minicomputer systems."

Some manufacturers will provide all hardware and service to the end user, but will recommend one or more software houses as potential vendors of application software.

In this case, the end user makes a separate contractual agreement

(Continued on Page S/16)

For Textiler Needing Better Control

'Instant Software' Factor in Mini Choice

By Patrick Ward
Of the CW Staff

UNIONVILLE, Conn. – Rising paperwork convinced Charles W. House and Sons, a specialty textile manufacturer here, that it finally needed a computer. But since the company was reluctant to write software, it chose a turnkey system.

The on-line system from Computer Covenant Corp. is based on a Digital Equipment Corp. Datasystem 350. It will offer on-line inquiry and update capabilities and allow dial-up communications with a House subsidiary in Maine, according to Henry A. Hamlin, House's vice-president and general manager.

The standard system includes a 16K CPU, removable and floppy disks, a CRT, a 50 line/min printer and applications software for about $900/mo, according to Computer Covenant.

Order entry and invoicing, inventory management, production scheduling and shop floor control are among the first applications House plans to put on the system, which will be installed in June.

Accounts receivable and payable, payroll, general ledger and requirements planning applications will go on the system at a later date, Hamlin said.

Control Major Factor

A need for better inventory control was the major factor in the decision to install the computer, Hamlin stated.

"Inventory control is critical nowadays to keep control over your expenses. Our manual recordkeeping could not keep up," he said.

Even though Hamlin thinks House's business will grow much faster this year than last, he expects the computer will allow the same number of people to handle the administrative workload.

The minicomputer should also help House put its employees' time to better use, Hamlin added.

Paperwork occupies "an awful lot of people's time," he said. House plans to shift this workload onto the computer free employees for "expediting and making decisions, rather than just pushing a pencil."

Though the computer is not yet installed, House has been planning on one for over two years. A consultant designed the company's manual inventory control system a number of years ago with the possibility of later computerization in mind, Hamlin noted.

House chose the Computer Covenant system because it wanted a prepackaged software system and was familiar with the vendor, he said.

House's own office staff will operate the computer system, he added, but outside people will continue to do the programming.

By June, the company expects to be keying customer requirements into the system, which will allocate on-hand or in-process inventory items and produce shipping papers.

The system will maintain an open customer order file for each item to handle changes, track order progress and provide data for invoicing and customer analysis.

The system will be able to match a forecast of future sales along with the current order backlog against on-hand and in-process inventory to generate item reorder requests.

It will also provide an open factory order file for each in-process factory order which will contain projected and actual dates, quantities and costs for each manufacturing step.

Data on the factory operation is now manually collected from the shop floor to update the factory order schedule. This information may later be entered through a shop-floor CRT, Hamlin said.

The system will then be able to use the data to report any variances between actual and projected dates and quantities at each manufacturing step to allow management correction.

The final computerized step will be reporting receipt of finished goods so the firm can prepare invoices. Additional reporting will include customer and product analysis to show ordering and scheduling trends, inventory valuations and sales trends.

System Summarizes Trading of Stocks

By Mike Marriott
Special to Computerworld

MOUNTAIN VIEW, Calif. – Instead of bread-and-butter applications such as inventory, accounts receivable and general ledger maintenance, time-shared minicomputers now perform specialized applications. The commodity and stock option data and information service developed by M & J Associates here is one example.

M & J founders, Michael Marriott and John Jennings, have created and maintained an extensive data bank of daily trading information and fundamental statistics on the basic 29 traded commodities as well as all stock options traded on the Chicago Board of Exchange and the American Stock Exchange.

Traders, analysts, brokers and mutual funds tap this data base from terminals at their offices. Not only can they obtain (on a 24-hour-a-day basis) each day's trading summary (open, high, low, close, volume, open interest) on each active commodity contract or stock option, but also computer analyses of this data.

Upon demand, the system will generate spreads, spread histories, trends, moving averages and many other data presentations. Depending on a trader's particular approach, he can call up the data needs, sorted in the way he needs it.

Tool for Traders

This application, has proven to be an invaluable tool to traders, according to the firm. Historically, the commodities market has been extremely volatile and fast moving. A trader must be prepared to modify his market position quickly, based on current market fluctuations.

Serious traders want to base such decisions on current information and careful analysis, the firm said. Before, this required a daily regimen of hand calculations on frequently unreliable data available through various public, private and governmental sources.

Obtaining an answer to a question such as "What if I had bought this commodity under the similar market conditions of five years ago" was not a simple task manually, the firm said, yet it could be key to a trading decision.

M & J's business has been growing rapidly (a 400% increase last year alone) since it was first founded in 1968. The company has assembled data base of some 40,000 records of 256 bytes each. Included in this data base are historical data on all contracts of all 29 commodities.

Once a commodity option is entered into the data bank, it is maintained for subsequent

(Continued on Page S/12)

On the Inside

Drafting System Takes Over Time-Consuming Tasks S/7
Apparel Maker's Turnkey Gives Today's Data Today S/7
Mini System Orders Medical Tests, Relays Results S/8
Definition of 'Turnkey System' Blurring S/8
Insurance Firm's Mini Provides Peace of Mind S/8
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Dedicated System Produces Reports as By-Products S/11
Turnkey Increases Steel Stock Utilization by 20% S/12

This special report was prepared under the direction of Esther Surden, CW staff writer. Cover art by Cynthia L. Kintzer.

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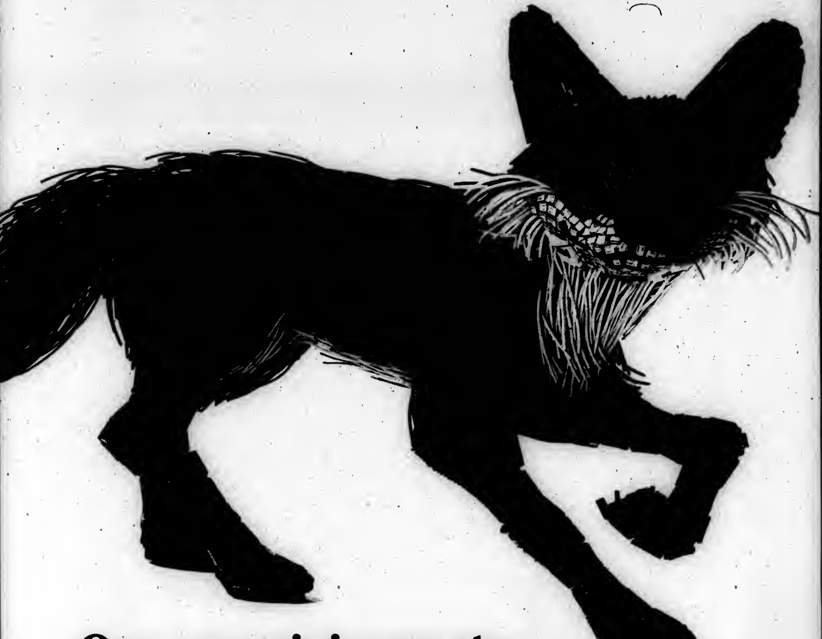

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Powerful central system architecture: Level 6 architecture is designed to support the most demanding minicomputer applications, and provide a full range of compatible systems from which the user will be able to select the one best suited to his requirements. Initial models include many of the following architectural features:

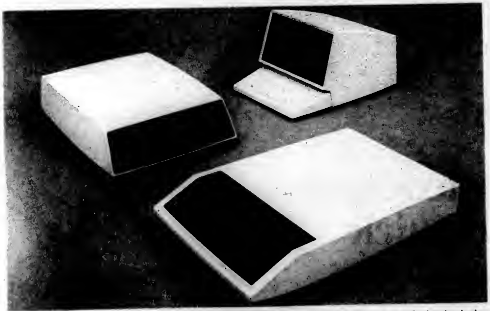
- Microprogrammed instruction set with writeable control store available to the user.
- Direct addressing up to 8 million words of memory.
- Minimum of 18 programmable hardware registers.
- Bit, byte, word and multi-word addressing.
- Hardware stack and queue management.
- Proven N-channel MOS memory in 8K by 16-bit modules, with byte parity and up to 32K words on a single board. Cycle time is 650 nanoseconds.
- Error detection and correction (Corrects single bit, detects two-bit errors).
- Memory management hardware.
- Over 100 basic instructions, with more than 600 variations.
- High-performance scientific and commercial instruction set extensions.
- Common asynchronous Megabus™ operating in an interleaved mode, with a bandwidth of 6 million bytes per second.
- Vectored interrupt capability with up to 64 interrupt priority levels.
- Separate trap structure with more than 20 unique entry points.
- Microprogrammed input-output controllers.
- Multiprocessor and networking capabilities.

The benefits include the ability to write compact and efficient programs, increased processing speed, reduced memory utilization and memory management overhead, reduced software overhead, increased throughput, and the capacity to handle large and versatile configurations.

Models 6/34 and 6/36 incorporate subsets of the above features and are immediately available. These models are well suited for OEM and system-builder applications. Maximum memory for the 6/34 is 32K words, and for the 6/36, 64K words.

Advanced modularity: Level 6 combines TTL logic, LSI and MSI circuitry, firmware-driven microprocessors, MOS memory, and etched wire connections in a new way to achieve plug-in modularity with optimum configurability and replaceability. Specifically:

- The entire central processor is contained on a single board 15"x16".
- Other 15" x 16" boards are devoted to the memory, communications processor, peripheral controller, and user interface.
- Functional modules (i.e. device adapters and memory modules) plug into the 15" x 16" boards.
- Boards fit into the bus without backplane wiring.



Level 6 offers a choice of rack-mountable, cabinet and tabletop models. Level 6 also includes a new full line of low-cost peripherals in both tabletop and rack-mounted versions. Shown are the tabletop minicomputer, diskette and CRT.

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*U.S. price in quantities of 50 for rack-mountable Model 6/34. Includes 8K words of MOS memory, with parity, multiply/divide, realtime clock, and bootstrap loader.

These features offer the following benefits: The sharing of costly logic elements such as controller microprocessors and memory error correction lowers the system cost. A system can be easily configured through the selection of a minimum number of appropriate boards and modules. Fewer components and connections mean increased system reliability. And serviceability is improved by having fewer — as well as more easily replaceable — components.

Microprogrammed communications processor: Honeywell's multiline communications board functions as a true front-end processor. It offers unusually powerful communications capability at moderate cost.

- Separately programmable memory allows tailoring to individual requirements.
- Usable memory of 4096 bytes enables execution of complex line-handling procedures with no central processor involvement.
- Each board handles up to eight full-duplex lines.
- A variety of modules adapt the communications processor for different line types and speeds (up to four modules per board, line types and speeds may be mixed on the same board).

As a result, the central processor is relieved of most of the data communications overhead, and the user has maximum application flexibility.

Built-in test and verification: The Level 6 system provides an automatic configuration integrity check and self-diagnosis:

- Light-emitting diodes on the central processor and each controller board verify logic quality.
- A console indicator verifies that boards, terminators, and bus cabling are properly connected at time of system initialization.

By means of these features, together with the simple replaceability of boards and plug-in modules, the Honeywell Level 6 system is designed to be the most serviceable minicomputer ever built.

Efficient system-building software: Honeywell has gained considerable system building experience through the application of minicomputers within the general purpose computer and control system segments of its business. This experience, together with the expertise gathered in ten years of building minicomputers, has been applied to Level 6 hardware and software design to produce integrated system products particularly well-suited to a wide variety of jobs. The initial software includes:

- Stand-alone program development system.
- Stand-alone multitasking realtime executive.
- Disk-based multitasking realtime operating system.
- Assembler, FORTRAN and utilities.

These are the first results of a comprehensive software development program. Scheduled for future release are additional higher level languages, communications software enhancements, and operating system extensions.

System 700 compatibility: Level 6 offers System 700 compatibility via the Model 6/06. The 6/06 incorporates the packaging and technology advances of Level 6 and supports the full range of System 700 software and peripherals. Memory is available in 8K word increments up to 64K. Systems are available for immediate shipment.

For more information, please mail us the coupon. We'd like to show you why Honeywell's Level 6 is the biggest news in minicomputers today.

The Model 6/06 is offered with a variety of peripherals. The configurations shown include disk drive, CRT, tape cassette unit, card reader, printer, and paper tape reader/punch.

The Other Computer Company:

Honeywell

Honeywell Information Systems, 200 Smith Street, MS 440, Waltham, Massachusetts 02154

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I am interested in Model(s) ☐ 6/34 and 6/36 ☐ 6/06

Increases Engineers' Output

Drafting System Takes Over Time-Consuming Tasks

BARTLESVILLE, Okla. – A minicomputer-based turnkey interactive graphics system at a petroleum company here has helped engineers increase their output of working drawings.

The system, based on a Varian Data Machines 620L mini and designed by Auto-trol Corp. of Denver, can perform many time-consuming engineering tasks, relieving the draftsmen of lettering, scaling, cross hatching, dimensioning, erasing, listing, calculating and even drawing, the firm said.

According to the Engineering Graphics section supervisor at Phillipa Petroleum Co., Nate Young, the Auto-trol system has made nine draftsmen produce like 27. "We found it difficult to recruit the skilled people we needed for expansion. We just couldn't fill the slots. With the new system, we have been able to keep up with industry growth," Young explained.

The system produces several types of engineering drawings, such as process flow diagrams, electrical schematics, printed circuit board layouts, three-dimensional drawings and assembly drawings.

The system also permits draftsmen to automatically change scales or proportions, mirror and rotate images, make perspective drawings from projected views and effortlessly repeat any often-used detail or symbol by calling it from memory and merely indicating where it should be placed.

No DP Knowledge Needed

No special knowledge of computers was required to operate the system. Training involved sending two draftsmen to a standard two-week operator training course. Techniques used were all related to standard drafting practices.

Additional draftsmen/designer operatora learned from the others how to use the system.

The Auto-trol Auto-Draft system utilizes the minicomputer as its graphics processing unit. Acting as a real-time processor and communications controller, the computer, coupled extensive software, allows all input and output units to operate independently and simultaneously on separate disciplines.

The real-time capability of the minicomputer allows each operator to be working in a different design/drafting discipline while the high-accuracy flatbed plotter is independently developing drawings in a background mode.

The system consists of the minicomputer with 32K core memory, five input stations consisting of two interactive video display units and three digitizer drafting tables.

Other parts of the system are a magnetic tape unit, magnetic disk storage, teleprinter, hardcopying unit and a flatbed drafting plotter for producing the finished wet-ink drawing.

The company looked at four other systems before choosing this one, a spokesman said. The Varian-based system was chosen because of ease of operations and enhanced software.

Still Growing

The firm has expanded its original $153,000 investment to a system that now has a $380,000 value, he continued, and may well expand again this year.

The draftsmen/designer operator starts to create a drawing with the system either by the use of the drawing table digitizer or with the interactivy visual display station.

Using either rough notes, gridded sketches, his own thoughts or a previously stored drawing, the operator quickly enters the drawing into the system.

Much of the time required to create a drawing is minimized due to the assemblies, etc., which appear frequently in drawings, need only be created once, then stored within the system. These symbols can be inserted quickly into any drawing wherever needed by the use of only a few keystrokes, rather than having to redraw them each time.

During or after the locating of each symbol, the operator digitizes the connecting lines of the drawing and adds necessary annotation and dimensioning. All drafting functions such as scaling, rotation, etc., may be applied to the drawing, and the entire drawing may be viewed immediatley or stored for viewing later on the CRT prior to plotting.

Repetitive operations can be performed through the use of operator-defined groups of commands called "quick actions."

By using these techniques as well as others in the Auto-Draft system to minimize the amount of effort required to create a drawing, significant savings in both time and accuracy are achieved. The operator is able to examine and correct his drawing using Auto-Draft's edit capability as he develops it, rather than after it has been completed.

Once the drawing has been created to the satisfaction of the designer/draftsman, the drawing can either be stored within the system for later use, transferred to magnetic tape or disk storage for subsequent off-line use or "drawn" by the Auto-trol precision flatbed plotter.

Using the Auto-trol Corp. Auto-Draft system, a draftsman makes alterations to a drawing in a fraction of the time necessary to perform the same job manually.

The automated graphics group is working currently on three shifts. At the end of each shift, to clear the system for the next shift, all drawings in various stages of completion are purged from the disk memory and "dumped" onto magnetic tape. A verifying program ensures that no drawing is lost in the process.

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Apparel Maker's Turnkey Gives Today's Data Today

Special to Computerworld

NEW YORK – To get today's information today, the Goldworm Sportswear Corp., a manufacturer of high-style women's apparel, decided to install a turnkey minicomputer system.

When too many goods are left hanging on retail racks, a store can find itself overextended; the sooner the supplier of the items on those racks has that information, the sooner credit authorization can be reviewed.

At first Goldworm engaged a service bureau to process accounts receivable. The company then purchased an accounting machine for in-house processing of invoices and "cut-and-sold" reports. The service bureau retained accounts receivable and other paperwork continued to be handled manually.

The hybrid system worked for a while, but the source documents were batch processed once a month, taking two weeks for turnaround, so information usually was six weeks old.

"We recognized there was a tremendous amount of paper flowing out at a large cost, yet the information we received wasn't adequate and certainly not timely enough," Gene Labinson, Goldworm's executive vice-president, recalled.

Not the least of the problem was that much of the work in the distinct DP areas was duplicative. The system was not integrated because it made little sense to try that.

Something better was required, but the problems were complex. With four seasons, two major lines, 800 inventory items with seven sizes to each item and each in an average of three different colors and with 1,500 accounts active at any time, the firm dealt with so many variables, many of them easily agitated, that an ordinary system wouldn't do.

This, in fact, was why it resorted to the hybrid mechanism in the first place, Labinson explained.

(Continued on Page S/14)

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Mini System Orders Medical Tests, Relays Results

By Nancy French
Of the CW Staff

YOUNGSTOWN, Ohio – Two dedicated minicomputers are helping physicians here improve and accelerate decision making by providing error-free diagnostic test results by phone wherever the doctor may be.

Although the system depends on the hospital's large general-purpose computer for a data base and for report generation, two minicomputers are dedicated to the tasks of managing laboratory test equipment and relaying test orders and results between the laboratory and the physicians who requesfed them.

At the Youngstown Hospital Association, a 1,000-bed, three-hospital complex, physicians order tests from the laboratory by writing their orders in the patient's medical records, as is done in most hospitals.

Nurses then place test orders by Touch-Tone phone or a specially designed patient-card dialer pad which accesses an audio response system known as Direct Input Voice Output Telephone System (Divots), operated by an IBM System/7.

To order a test, the nurse keys in the Divots extention number. The System/7 responds with a voice message asking the nurse to enter the requested test code numbers.

Within three seconds the audio-response system verifies the identity of the patient by spelling out the first six letters of his name. The nurse then enters the remaining data, including the patient's location and the time of the physician's order, followed by test-identification numbers which can be double-checked using a specially prepared hospital directory.

As soon as the test codes are entered, Divots' voice response states the name of each test ordered, thus verifying the request and assuring absolute accuracy of the two most vital test reliability factors – the patient's name and the name of the test, according to Dr. Arthur E. Rappoport, the system's principal designer.

If incorrect numbers are entered, the nurse hears the word "error."

Special instructions also may be entered using code numbers.

As soon as the transaction is completed, a printer in the laboratory connected to an IBM 370/135, prints out the patient's demographic, logistic and test information on sequentially numbered and prepunched requisition cards.

A technician removes the preprinted and prepunched requisition from the laboratory printer and follows up the request by going to the patient's location to obtain the necessary specimens.

Data Double-Checked

To assure no mistakes are made, the technician double-checks identification data on the requisition against information on the patient's wristband before drawing a drop of blood.

After specimens are collected in various tubes and bottles, identifying card stubs are attached by special rubber bands, and specimens are shuttled to the laboratory.

In the laboratory, the stub cards are inserted into an instrument that identifies the specimens and records their time of arrival. The specimens are then loaded into appropriate test devices and the actual analyses are performed.

All test devices – both automated and not so automated – are hard-wired into a Data General Corp. Nova 1200 Laboratory Data Manager (LDM), designed by T&T Technology.

If tests are automated, the LDM measures instrumental outputs against values of primary reference standards and other similar material, and results are computed.

Output is collated with the specimen numbers, and the data is merged with the patient's hospital number and transmitted to his master file in the 370.

In the case of manual tests, results are written and then keypunched on port-a-punch cards. All cards are then read into the LDM and transmitted to the patient's master file.

After reaching the patient's master file, test data is available for transmission to the physician.

In case of an emergency, the physician's

(Continued on Page S/10)

Definition of 'Turnkey System' Blurring

By Norman S. Zimbel
Special to Computerworld

The trend by minicomputer manufacturers to ever more integrated systems products continues. These systems, consisting of a family of processors, system software and supporting peripherals, typically are made application-specific by means of appropriate system software and peripherals.

Thus we see software and peripherals with features tailored, for example, to sensor and control applications, to data communications applications and to business data processing.

Compared with their predecessors, present-generation minicomputer systems are characteristically very well supported in the areas of software and peripherals. This facilitates the programming of such systems by end users and, as a result, works against systems houses specializing in the business of complete turnkey systems, where a turnkey system can be defined as a product which is a complete system implementation for a specific application.

In the business DP market, however, there is a spate of low-cost, general-purpose systems and a large number of relatively small firms which can afford these sytems. Thus, systems houses catering to this market with turnkey systems based on products such as Management Assistance Corp.'s Basic Four, Digital Equipment Corp.'s Datasystem 300 and 500 and the Wang 2200, to name a few, have proliferated. We at Arthur D. Little, Inc. estimate there are about 100 to 200 such firms servicing this market domestically.

The term "turnkey system" has always been somewhat fuzzy and it is getting fuzzier.

Now that microprocessors are with us, do we consider a microprocessorized pinball machine a "turnkey system?" Or, on a different plane, is a microprocessorized blood pressure monitor also one?

The word game becomes more and more abstruse. This much we can say – the proliferation of minicomputer- and microcomputer-based turnkey products is an established fact and the trend is upward.

Further, the established turnkey systems development firms spawned by the minicomputer industry for servicing applications as diverse as business DP, process control, automated test equipment, data communications, miscellaneous data acquisition and control usage, among others, are being supplied with better and better system "vessels" for their application programs by the systems manufacturers.

This class of company is also adopting the microcomputer as a natural adjunct to the minicomputer and is being augmented by other systems houses specializing in microcomputer-based turnkey systems.

As to where we draw the line for a microprocessor-based turnkey item between an "equipment" and a "system," we leave that as an exercise for the reader.

At any rate, the need for specialized systems houses to develop dedicated turnkey systems will continue to grow but – and this is a new element – microprocessor-based products from a broad variety of product manufacturers and systems houses are now also a feature of the turnkey systems market.

Zimbel is a senior staff member at Arthur D. Little, Inc.

Insurance Firm's Mini Provides Peace of Mind

CHICAGO – Premium billing, policy updating, new policies and commission charges can create a staggering paper load if you have a customer base of about 25,000 policy holders, as is the case with Capitol Insurance, Inc. of Chicago. A turnkey minicomputer system is helping alleviate that load.

Some time ago, Capitol had turned for assistance to a service bureau. More recently, the firm determined that purchasing its own mini was something it could easily afford and, according to William Hubbard, Capitol's data processing manager, the security and control offered by keeping all computer records in the office had irresistible appeal.

Also, the fear of losing punched cards made a disk system seem worthwhile.

Peace of Mind a Factor

While peace of mind was the major factor in the decision to become a computer owner, Capitol has found that a surprising number of functions done by clerks when the firm was using a service bureau are done by its own computer system with very little additional programming and formatting on Capitol's part, Hubbard said.

"There's no doubt that there are jobs that can be run faster on a large-scale computer such as an IBM 360," he said.

"Tasks such as sorting large card files and printing out lengthy reports were done overnight with the service bureau with no time taken out of our normal work day. On the small business system, report printing can require an entire day.

However, we have found that, aside from having everything in our hands, we are able to do invoicing, cash accounting, accounts receivable and automatic printing of renewals and installments almost incidentally on our own small computer."

Basic/Four Mini Used

Capitol Insurance uses a mini manufactured by Basic/Four Corp. of Irvine, Calif. The system includes two video display operator terminals to enter information or call up instant responses to in-

(Continued on Page S/12)

GENERAL PURPOSE LOGIC MODULES AND PERIPHERAL INTERFACES FOR DEC PDP-11 NOVA* INTERDATA

MDB Systems general purpose interface and logic modules provide greater functional flexibility and user designed component density than those from the manufacturer. Any DIP IC configuration can be mounted on the component side of the board, plus provision for discrete components at each IC position. MDB logic modules are low in cost with greater performance capability.

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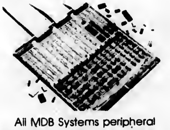

All MDB Systems peripheral interfaces are software transparent to the host computer and are completely compatible with host diagnostics, drivers and most operating systems. Operation and programing considerations are exactly as described by the manufacturer. Appropriate cabling and connectors are included as standard. Low cost interfaces are available for all popular models of line printers, card equipment, plotters, and paper tape equipment.

For NOVA users, MDB also offers an expansion chassis with optional power supplies, and ASGOL, a powerful, high level structured programing language, with assembly language as a subset, operating under DOS, XDOS and RDOS.

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Mobile Testing Service Keeps Hospitals' Costs Down

PARAMOUNT, Calif. – Nearly 250 hospitals in the Los Angeles area pool new technology and keep operating costs down through a minicomputer-based system provided by Omnimedical Services.

The company offers a mobile testing and analysis service that permits hospitals to obtain the most advanced equipment possible on a shared basis, as needed. It also supplies physical examination test results to industry.

The firm provides specialized equipment for nuclear medicine, diagnostic ultrasound, neurology, cardiology, pulmonary function testing and even xeroradiography that most hospitals cannot afford by themselves.

And rather than lose patients – thus having empty beds – through referrals to neighboring hospitals where such equipment might be found, most hospitals prefer to call on the technologists and mobile gear found at Omnimedical.

Emphasis is placed on giving the hospital's physician the most complete analysis of data possible to utilize in his interpretation of the tests.

They offer remote computerized analysis of many tests, dialing up a Reality mini from Microdata Corp., located back at the office, right from the hospital testing room.

Interfaced to the Microdata machine is a Hewlett-Packcard (HP) ECG Management System. The interfacing, most of the software support and some of the system maintenance is provided by a service bureau specializing in the medical field, a spokesman said. The HP machine does all of the scientific calculations and sends out the results to the Reality machine.

The use of the system has helped remove some the burden on the company's staff of 50 technologists, since complex and time-consuming calculations such as dynamic cardiogram analysis, pulmonary function studies, systolic time interval analysis and heart pacemaker evaluation can now be done in minutes using the computer.

"We're currently handling about 4,000 procedures a month, at an average cost of $125 or less per procedure to the patient," an Omnimedical spokesman said.

"We feel this actually is highly efficient use of some rather sophisticated equipment. For example, if each of 200 hospitals had to buy its own $20,000 nuclear scanner, that would cost a total of $4 million. The fee to the patient would obviously be very high. Yet each hospital can offer our service to its patients – on a personal schedule, as needed – at a patient fee of as low as $20, depending on the procedure."

Scheduling Services

To schedule the services, physicians and hospital personnel call the dispatchers at Omnimedical. The properly trained technologist will show up at the hospital at the requested time, unload the appropriate test equipment from his van and perform the tests.

The system consists of a Microdata 1600 central processor with 24K words of memory (an additional 8K is on order for system expansion), a 10M-byte disk drive, two CRT and keyboard terminals and one line printer.

The system is equipped with three modems so that the four portable teletypewriters located in mobile vans can dial up the computer over ordinary hospital telephones, feed test results into the computer and have the computer print out the analysis right at the patient location.

"We've just added new programs to handle the business side of our operation, for general ledger work, payroll records, accounts payable and accounts receivable," a spokesman said.

The firm originally looked at programmable calculators for performing test analysis computations, but switched to minicomputers because of the additional capabilities. Three other manufacturers were considered before deciding on Microdata's Reality system because of its English language and its virtual memory capability.

"These have meant that any of our people can handle test analysis and with little training in computer operation because they can simply talk to the system in plain English," a spokesman said.

Prior to installing the mini, Omnimedical had used a time-sharing service for its pulmonary function testing. It had spent about $1,800/mo for the service, and the Reality system now is doing far more work for a cost of $1,100/mo on a comparative basis, the firm said.

The RIGHT Flexible Disk Drives and Systems Are Made At Remex.

The **right** flexible disk drive has format flexibility – accepting IBM format, soft sectored and 32 hole hard sectored disks in the same unit – while addition of a sector generator option permits creation of alternative hard sectored formats.

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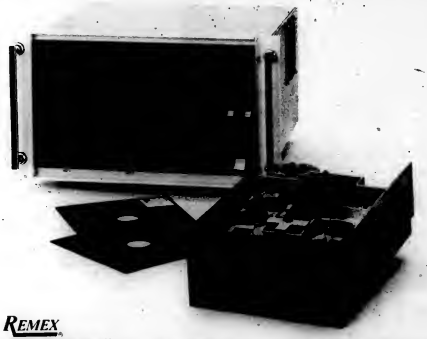
The **right** drive has fast throughput with 6 ms track to track access.

The **right** drive has a unique high reliability design – die cast frame – supported lead screw head positioning – operator interlock for media protection – and a foolproof write enable feature.

The **right** flexible disk system is custom designed for the exact requirements of the quantity buyer – one to four or more drives – formatting of both IBM and hard sectored media interchangeably – double density electronics where required – interface to any mini/micro computer – packaged in rack mount or desk top configurations according to application – and software ranging from simple driver to a complete operating system.

The **right** flexible disk system is made by REMEX – the only flexible disk drive manufacturer with both the total capability to design, manufacture and maintain custom systems for individual applications – and the total commitment to the specialized needs of the quantity systems buyer.



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System Orders Tests, Sends Back Results

(Continued from Page S/8)

private ID code as well as special attention codes are also keyed in with the test order and, as soon as results are available, Divots relays the information to the physician via an autocall system.

Since the patient's location and telephone number is contained in his master file, the 370 can inform the System/7 to dial the telephone at that location.

The nurse or physician who answers such a call hears a series of chimes from the audio-response disk identifying it as a Divots call.

The listener then enters the location code and Divots automatically transmits the patient's name, the test name and the results repeatedly until the listener hangs up.

If tests are routine, results are held for printing daily at noon on a ward report which is delivered by messenger to all nursing stations within the hospital.

At the same time, billing is updated, exceptions are noted, and quality control reports are generated for permanent file.

A final complete report of the day's tests is printed at the end of the day.

All laboratory data stored on disk in the 370 is immediately retrievable by Divots, CRT or printers, according to Rappoport.

Each patient's lab record is retained during his entire period of hospitalization plus 15 days after departure, at which time data is transferred to magnetic tape for permanent storage.

What the system saves in time and cost can be measured, but what it gives us in improved patient care, early responsiveness and increased productivity can only be estimated, according to Rappoport.

Development funds for various parts of the system have been provided by the Department of Health, Education and Welfare.

Simplifies Hospital's Accounting

Dedicated System Produces Reports as By-Products

Special to Computerworld

ORANGE, N.J. – When many hospitals post charges to patient accounts, they touch off a flurry of bookkeeping activity that ultimately ends in a series of operating reports.

With a dedicated minicomputer, when St. Mary's Hospital here records patient charges, everything following is an automatic by-product.

A daily revenue report, discharged patient log, inpatient trial balance and discharged patient aged trial balance can be compiled by the firm's NCR 399 minicomputer system.

"The objective was to updste our system, give it some flexibility and achieve better results to get more adequate statistics," Sister Mary Monica, business manager of the 228-bed general hospital, said. "We also wanted to tighten controls."

In replacing an electronic accounting machine with a minicomputer, the hospital has updated its inpatient system. Patient charges can be converted automatically into different reports as a by-product of updating patient's ledgers.

The figures are more accurate and, in most instances, more complete than previously available, the hospital said.

St. Mary's Hospital, an institution operated by the Felician Sisters, was ready for a new approach to inpatient accounting.

With over 7,400 admissions in 1974 and about 1,000 charges per day, an average of five per patient, volume was increasing. Operating costs of the electronic accounting machine, leased for eight years, were high.

When St. Mary's installed the minicomputer, a machine with a 14K-byte memory and two magnetic tape cassettes for program loading and data storage, it also accepted a package for inpatient accounting which features magnetic ledger cards and the concept that most reports are generated from posting daily charges and patient discharges.

Patient Admissions

When a patient is admitted, a five-part record is typed at the admissions office. The carbon-interleaved form is attached to the back of a ledger so that when the patient's history is recorded it also is copied onto the ledger card.

The five-part form is distributed and the ledger card is sent to the accounting department where the patient's number, name, age, admission date, room code and insurance code (Blue Cross, Medicare, Medicaid, commercial insurance, self-pay) are recorded on the face and simultaneously on the magnetic stripe. The ledger is then filed in the "in-house" billing tray.

On receiving charge slips from various departments, the minicomputer operator enters them at random by patient. The charges are stored in memory, while all charges for that patient are entered, then sorted internally by service for automatic updating of the magnetic ledger card.

In the past, charges were hand-sorted by patient and service and then individually posted, a time-consuming process.

Where radiology or accounting departments priced each charge, the radiology department now enters a transaction code on the patient's charge slip and this is entered into the system.

The code is matched to charge codes stored in memory and the price is calculated and printed on the ledger automatically. While St. Mary's has stored over 140 different radiology charges in memory, the system can facilitate over 255.

"We started with radiology, but plan to expand computer internal pricing to at least one other department," Sister Mary Monica said. Room charges are automatically calculated based on the patient's room code.

Patient charges are identified and entered individually and accumulated as programmed for posting to the appropriate columns on the ledger card. This data is also captured on the ledger's magnetic stripe, and as esch day's charges are posted a new balance is calculated.

One system modification permits cash receipts and allowances to be posted at the same time as charges are being entered.

Meanwhile, the daily inpatient revenue report analyzes charges by room code and 31 services by insurance class for the day and month to date. This data is compiled by the minicomputer from information stored in the computer's memory and on the magnetic stripes of the control cards.

Transfers and discharges are processed twice a week. Patients are not billed until at least five days after discharge to allow late charges to be posted.

Discharged patient ledgers are presorted by insurance code, and the mini automatically foots and prorates the patient's account. The data is then transferred to a magnetic tape cassette.

The discharged patient's ledgers are updated with cash receipts, allowances, adjustments and refunds as they occur. With the magnetic data cassette, the system generates a detailed discharged patient log with patient charge analysis by service code.

The inpatient trial balance is run from an in-house ledger file, while the discharged patient trial balance is available from information stored on magnetic tape cassettes.

An operator inserts magnetic tape cassette into console of minicomputer.

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The 2400 is a mini-computer-based data handling system specializing in I/O service to large computer users. It performs functions off line which would normally consume up to 80% of costly mainframe time. And it can handle several operations concurrently:

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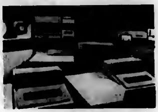

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Reduces Design Time

Turnkey Increases Steel Stock Utilization by 20%

CHICAGO – An automated design/production system, the Sanders 900/2250, that increases steel stock utilization by 20% and enables hydraulic tubing design that previously required 50 man-hours to be performed in one hour has been installed at International Harvester.

The automated system features a Sanders Associates, Inc. computerized graphic display system which enables users to either create new designs on a 21-inch grahic display or to retrieve and display any of 10,000 computer-stored drawings and alter them if needed.

The Sanders system includes a Varian 620L minicomputer with 16K of storage that handles functions such as priority interrupts and extended addressing.

The system uses Sanders 965 graphic displays, and the mini emulates the operation of an IBM 2840 controller to the 370 mainframe. As a result, the Sanders' CRTs look like IBM 2250 terminals to the 370.

The Sanders system allows the display units to operate remote from the CPU, which is a feature not available with the 2250s, according to a Sanders spokesman. The mini and terminals act as a turnkey remote subsystem with applications software residing in the 370.

The 370 transforms the displayed information into a hard-copy drawing via an automated precision plotter. The hard-copy information is sent to a manufacturing facility where an optical reader traces over the opaque lines of the drawing while simultaneously moving a flame-cutting machine of two to eight torches to produce the required parts.

Prior to installing the system, designers could only produce one part per stock plate. Designers can now nest many parts to obtain maximum efficiency of stock.

Either a large number of the same item can be displayed and flipped about or different order parts can be mixed on the screen for maximum utilization. The efficiency of the steel plate increased from 50% to 70.3% and the cutting times have also been optimized, the firm said.

The system, installed at International Harvester's Engineering Center for Agricultural Equipment, also produces numerical control tapes of engineering drawings which can be sent to user divisions for automated production of parts.

Hydraulic Tubing

The International Harvester hydraulic tubing program enables one designer to perform in one hour the equivalent of 50 man-hours on a drawing board.

A mathematical representation of the tube is displayed on the console screen and calculations for stretch, spring back, length and type of tube, etc. can be performed and depicted.

From this information, a number of drawings are generated including a full-scale shop template which is used to fabricate a prototype tube part.

The system enables engineers to change scales by touching a Photopen device to the screen. In addition, the drawings can be produced both in U.S. as well as the metric system. The system also generates vendor and tooling information automatically.

The automated system also performs structural analysis on tractor and loader chassis by displaying a three-dimensional image on the screen for analysis.

As the computer simulates increased loads on the protective frames and chassis, the system depicts the deformation of each element. Designers can continue increasing the load until an actual break occurs.

Analyzes Linkages

The Sanders system is also used for a steering geometry program which analyzes four types of linkages used on off-road equipment built by International Harvester for copper mining and other uses.

The various steering linkages are displayed on the console screen and analyzed for jackknifing, wheel locking, height of tie rod about ground, king-pin inclination, sequential turns and king-pin offset.

At present, the company has approximately 10,000 digitized parts drawings stored on disks. When a part or parts are requested, a catalog appears on the screen in the form of part numbers.

By touching the Photopen to the desired part number, users can call up and display the part within seconds.

The displayed drawing can be altered if necessary or sent directly to the computer for printout on the plotter.

The Sanders hardware costs about $160,000. The software is available from International Harvester.

System Analyzes Trading of Stocks

(Continued from Page S/2)

analysis and historical comparisons with current data.

The firm uses the Model 4000 interactive time-sharing system made by Basic Timesharing, Inc. (BTI) of Sunnyvale, Calif. The system consists of a minicomputer with 64K bytes of core memory, a disk controller and disk drives with a 73M-byte capacity and a 32-port communications controller.

Each of M & J's clientele has its own terminals, and communicates with the Model 4000 over phone lines. Most traders write their own programs, the firm said. The system uses an extended version of Basic (called Basic-X) which BTI has developed for use by nonprofessional programmers.

Each trader seems to have his own approach to analyzing market data. M & J does not provide formal training of its clients, offering just the BTI standard documentation, yet clients have been able to write special programs for quite complicated trading models with little difficulty, the company continued.

"Of course, we do the really complicated programming – a pattern recognition program, for example – for them," Marriott said.

Clients can request a wide variety of "standard" outputs. Included are: Market quote (open, high, low, close, volume, open interest) by commodity or by contract; moving averages of any commodity for four intervals; price history by commodity; spread between contracts; weekly price range over a specified number of weeks for any contract; and graphic representations.

"The acceptance of this service has really been accelerating," Marriott said. "Some of our clients have told us that their analysis costs have dropped by 90% and that they are much more confident of both the data and the results.

"Hardware reliability was one of the primary reasons we selected BTI's system in the first place. It's been so reliable that we've never had to go to a backup and reload because of a hardware failure."

Recently, the firm added a Bunker-Ramo automatic quote system which interfaces directly to the BTI system to input all close-of-market data each day. This not only permits a complete data base update by 3 p.m. each day, but it relieves the company's personnel from the time-consuming task of manual data entry each day.

The company is also planning to increase its computing capacity to meet the expected demand. BTI's "clustered" design permits expansion of the system to support as many as 256 concurrent users.

Up to eight 4000 systems can be clustered to allow sharing of central processor and disk storage facilities.

Marriot is co-founder of M & J Associates.

Mini Gives Firm Peace of Mind

(Continued from Page S/8)

quiries and a medium-speed line printer for producing printed reports.

The system incorporates two magnetic disk drives that provide 4.2M characters of storage, in addition to 32K characters of core memory in the computer. The company paid $50,000 for the system three years ago.

"In the past it was necessary to prepare information for processing in our office and messenger it to an operator who keypunched the data. It was then run on the service bureau computer at night. The next day the output had to be reviewed.

If there were errors, the process was repeated. This is tolerable for large operations such as handling cash receipts that require enormous files, but do not have to be on-line for quick review.

"It is much too great a hassle, however, to go through this cycle for all the convenience programs we operate now," Hubbard said.

Among the programs run on Capitol's own system are an accounts payable routine that previously required a clerk to compute commissions taken on each invoice charged.

The firm can implement a program that figures commissions when the invoices are prepared.

Installment payments and renewal notices for new policies are entered and stored on a master disk pack with the preparation of the first invoice.

After that, at the end of each month, the system reads through the master disk pack to check effective dates and expiration dates on policies.

At the end of the first year or at any other payment date, another invoice is automatically prepared. Three months before the expiration date of a policy, a renewal notice is automatically printed out.

A program for figuring aged receivables has also been incorporated. This element was not figured at all by Capitol in the past and thus provides an added degree of exactness in financial accounting.

Another special element implemented was the preparation of 1099 forms for filing commission income tax reports to the Federal government.

In the past, this information was derived manually and typed out, whereas in the present system the data is available from sources already stored in the computer.

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Hybrid DP Not Fast Enough

Turnkey Gives Timely Apparel Data

(Continued from Page S/7)

The firm became convinced the only way to go was toward an interactive, on-line system in-house. It was essential to pull all the pieces together.

Three important factors which concerned the company were that more information had to be made available more quickly; credit information specifically had to be made current; and the organization had to digest the system relatively quickly and without significant disruption.

The search led Labinson to Mini-Computer Systems, Inc.'s Micos.

With Micos, the focus is on the transaction. An order is entered and a sequence is triggered that produces a flow of activities and reports.

Working in real-time and interacting with the system, the Goldworm operators and managers move orders along and get immediate fixes on various critical factors.

More than 20 reports are produced in-house. Some are available daily as a routine matter or more frequently if needed.

Current personnel were readily trained to operate the terminals and no DP specialist had to be hired, the firm said.

The primary sectors serviced are order entry, shipping/invoicing, inventory control and accounts receivable. As an order is entered, it is displayed on a CRT screen. When visually verified by the operator, an acknowledgment is printed out for mailing to the customer.

But if the mini turns up the fact that the order will exceed the customer's credit limit, a supervisor has the information and a decision can be made on whether to process the order.

Since the system is as current as the last transaction, reflecting orders, shipments and payments as they occur, the company has a more solid base from which to function.

Cut-and-Sold Report

Credit information, though important, is hardly the only current requirement. Probably the most important item of all is the cut-and-sold report which shows, style by style, the availability of a particular item and the up-to-the-minute orders for it. This permits the shipping supervisor to allocate shipments among customers.

The instant availability of the cut-and-sold report makes it feasible to engage in judicious allocation and, at the same time, influences orders to the mills, Labinson said.

The Micos system at Goldworm consists of a Data General Nova 2/10 with 65K memory, two Diablo 10M-byte disk drives, two Hazeltine CRT terminals and a Data Printer 600 line/min printer.

The system is readily expandable, Labinson said; a third CRT was used recently during a particularly busy period and five could be on-line with adequate response time maintained.

Management has not delegated decision making to machines, the firm said. "The same people are still saying 'yes' or 'no' or 'order 10 dozen of this or that,' " Labinson said.

'Turnkey' Defined

MAYWOOD, N.J. – STC Systems, Inc., a turnkey systems vendor here, defines a turnkey system in the following way:

- The vendor supplies hardware; interfacing and tests for quality control.
- All software is vendor-supplied.
- Installation is taken care of by the vendor.
- A conversion plan is prepared by the vendor.
- Maintenance is available from the vendor.

The word "turnkey" describes a computerized business system that is designed, assembled, given the power to "think," installed with a customer training program and maintained by a single vendor, the firm said.

FORM FITTING.

A Hewlett-Packard terminal lets you generate the forms you need without taking up valuable computer time and without special programming. A plug-in Forms Drawing option lets you generate almost any form your company is used to using—just the way your company is used to using it—right from the terminal keyboard.

Familiar-looking forms stop mistakes; cut down on time wasted as operators try to decide what goes where.

Then, from the same keyboard, add in protected fields as further assurance that the right information won't wind up in the wrong places.

For still greater operator convenience, you may want to lock in form headings—while the data under them is continuously updated and transmitted to the computer. Or use inverse video, optional half-brightness, underline, or even blinking characters to clarify where information goes and what musn't be forgotten.

The Hewlett-Packard 2640 terminal series offers, in addition, powerful local editing and formatting capabilities. Modular design. Built-in self-test. An unusually readable display. Optional character fonts (you can even design your own). Or, choose the 2644A Mini DataStation for the same features in a terminal with mass storage capability for stand alone operation and the convenience of two 110,000 byte, pocket-sized data cartridges.

Call your local Hewlett-Packard office, or write for all the details on the terminal family that fits your way of doing business.

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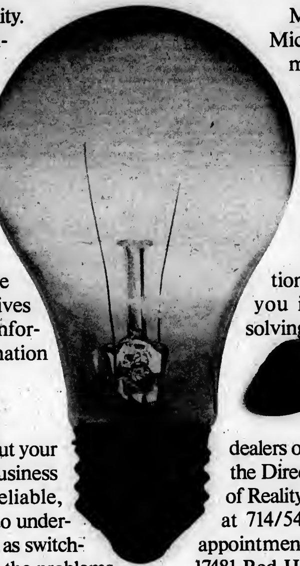

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Defining 'Turnkey Vendor' a Job for Shakespeare

(Continued from Page S/2)

with the software firm. The user is now dealing with two vendors and must coordinate their efforts with regard.

The software firm, by our definition, is not acting as a turnkey systems vendor since he is only responsible for software development and is not an interface between the end user and the manufacturer. This has often ended in a finger-pointing, "Who's on first?" fiasco.

Single-Vendor Interface

In some cases, a manufacturer will provide all hardware and service and will subcontract the development of application software to an independent software house.

This configuration fits part of the definition in terms of an apparent single-vendor interface, but limits the end user's contact and influence on the software house, which can impact both the "minimal-cost" and "immediately available" aspects of the definition.

The user can get caught between the subcontractors squabbling with the manufacturer every time a slight modification to specifications is made.

A rarer variation is where the manufacturer allows the software house to be selected and directed by the end user, but will assume prime-contractor responsibility in the event that the software house does not deliver the product agreed upon.

These arrangements tend to be overly legalistic and too much time is spent in describing the extraction of the "pound of flesh" than in describing the product to be delivered.

Prime Contractor

A more acceptable and increasingly more prevalent arrangement is where the software firm becomes, in essence, the prime contractor. He does this by virtue of purchasing the required equipment from the manufacturer and developing the specific software necessary to meet the end user's requirements and installing it when the end user is satisfied with its performance.

In most of these cases, service and maintenance is provided by the manufacturer or a separate service organization who is contacted directly by the end user when needed.

This allows the end user to deal directly with the supplier of the most important element in the package, the software.

It allows him to review progress and make changes to the system prior to its being installed in his shop. It obviates the need for him to be involved with the manufacturer with regard to systems software, which now becomes the responsibility of the turnkey vendor.

It may permit him to achieve a total lower cost for the turnkey system since the turnkey vendor can pass on quantity discounts and/or OEM (a misnomer to be explained later) discounts in the form of lower software costs.

This type of arrangement permits him to take Investment Tax Credit on the entire turnkey (hardware/software) price and not only on the hardware cost. It establishes a rapport between the end user and turnkey vendor which can lead to a continuing relationship involving software maintenance and subsequent hardware and/or systems upgrade.

In short, it substitutes as the end user's major partner in the venture – the experienced, industry-oriented systems professional.

There are several subtypes within the latter, all of whom we feel fit the definition of turnkey systems vendor.

The first is the systems house who may have no specific arrangement with any particular hardware manufacturer, but is prepared to act in a turnkey capacity for a range of minicomputer equipment.

In this case, the end user may first have to select the equipment he desires and then the software firm who will purchase that equipment and install it.

The firm could be recommended by the manufacturer, although it is more typical that a manufacturer will recommend a firm with whom an OEM agreement has been established.

The Misnamed OEM

This brings us to our second type of turnkey systems vendor, the misnamed OEM. The term "OEM," which stands for "original equipment manufacturer," has been distorted to apply to turnkey software vendors who purchase equipment from a specific manufacturer. Perhaps OSM (original software manufacturer) or OSD (original software developer) would be more appropriate.

The OEM usually has signed an agreement with one or more manufacturers which permits him to earn a discount on all systems he purchases within a specified time period.

The amount of discount usually increases with the number of systems sold. This discount is normally not available on a direct basis to end users, although they may be entitled to a quantity discount. Thus, as we have previously mentioned, the successful OEM can use all or part of his discount to pass on lower turnkey costs to the end users.

The manufacturer usually allows OEM discount only on components he manufactures. For example, if the manufacturer in turn purchases peripherals, i.e., disks from another manufacturer (a real OEM), then no discount is allowed.

An OEM can have an agreement with more than one manufacturer, but normally will concentrate on one in order to increase his potential quantity discount.

Some OEMs put complete systems together by buying system elements directly from the component manufacturers, thereby reducing the total hardware costs considerably.

The large mini manufacturers prefer to sell to end users directly only when those end users are self-sufficient from a DP standpoint.

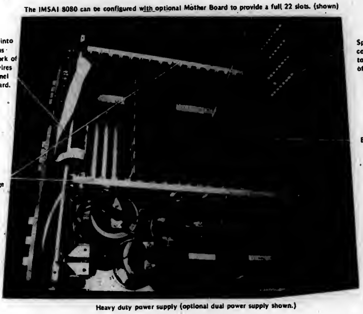
Another type of turnkey system vendor is the software firm who has a distributorship for a specific minicomputer. Distributorships are usually granted by the smaller minicomputer manufacturers who cannot support extensive sales and/or service organizations.

Generally, the distributor earns a much higher discount than other OEMs because his product is less well known and he must supply most if not all the marketing effort.

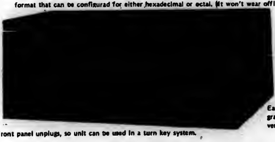
Farano is executive vice-president of Gambit Management Strategies, Inc., a New York retail management consulting firm and turnkey minicomputer vendor.

IMSAI

The IMSAI 8080 can be configured with optional Mother Board to provide a full 22 slots. (shown)


Front panel plugs into Mother Board, thus eliminating the work of soldering all the wires from the front panel to the Mother Board.
Special PIO Board configurad with LEDs to monitor each bit of each of the 4 ports.
Extender Board available.
Sturdy Card Cage
Heavy duty power supply (optional dual power supply shown.)

The IMSAI 8080 is designed using the full Intel family of large scale integration chips, thus providing high reliability and greater flexability.


Front panel hosts a photographic legend to produce a clear, concise, easy-to-read format that can be configurad for either hexadecimal or octal. (It won't wear off!)
8 additional program controlled LEDs.
Commercial grade cabinet
Easy-to-use commercial grada paddle switches– very crisp and solid.
Front panel unplugs, so unit can be used in a turn key system.

COMING SOON: Free BASIC and extended BASIC for registered IMSAI 8080 owners, followed shortly by Fortran IV and PLM.
TERMS: Check or money order, Bankamericard, Master Charge, 25% deposit on COD orders. On all ordera under $1,000, add 5% for handling. On orders over $10,000 subtract 5%. California residents add 6% sales tax.
SEND FOR FREE CATALOG OF IMSAI MICROCOMPUTER PRODUCTS DEALER INQUIRIES INVITED
SPECIAL NOTICE TO ALTAIR 8800 OWNERS:
If you would like to step-up to the superior quality of an IMSAI 8080, you will be pleased to know that your ALTAIR 8800 boards ara "plug-in" usable—without modification—in the IMSAI 8080 cabinet. Furthermore, by acquiring IMSAI's unique Memory Sharing Facility, your ALTAIR MPU board and IMSAI MPU board can co-exist in the same cabinat, operate in parallel with each other, and share all memory in common. This is the technology that laid the foundation for IMSAI's powerful HYPERCUBE Computer and Intelligent Disk systems (recently faatured in Computerworld, Datamation and Electronics magazines.)

IMS ASSOCIATES, INC., 1922 REPUBLIC AVENUE, SAN LEANDRO, CA 94577
(415) 483-2093

Here are some of the companies we'll be keeping at the Computer Caravan 76.

The Bell System

The Bell System will demonstrate how its products and services are solving customers' problems and meeting their needs. By utilizing user's applications, the Bell System will feature the Dataspeed® 40, Transaction* telephone, Vu Set, Dataphone® data sets and network services.

® Registered trademark of AT&T Co.
* Trademark of AT&T Co.

key tronic corporation

Key Tronic presents DATAWAND, the handheld OCR system. DATAWAND recognizes eight different character fonts, including OCR-A alphanumeric, MICR, E13B, 1428, and 7B. DATAWAND reads any size form at speeds up to 100 characters per second and is RS-232 plug compatible.

software ag
OF NORTH AMERICA INC

ADABAS – the Adaptable DAta BAse System – is a generalized DBMS which supports a network of files using inverted file techniques. ADABAS provides data compression, efficient space management, data protection, data security, and host and self-contained language facilities. Over 60 installations in North America.

SOFTWARE INTERNATIONAL

Software International has sold over 500 systems to small, medium and large organizations in all industries who have installed IBM S/360/370, IBM S/3, or Honeywell 2000 series computers. We have a full line of Financial, Manufacturing and Banking Systems.

Lockheed Electronics

The Lockheed System III family of small business computers will be featured at their Computer Caravan/76 exhibit. The disk-based systems are RPG II compatible and support up to eight on-line local/remote terminals with the Multi User Operating Systems. Dual programming capabilities displaying instantaneous data inquiry and retrieval, will be demonstrated during exposition hours.

TEXAS INSTRUMENTS
INCORPORATED

Texas Instruments will display and demonstrate models of their 990 Family of micro/minicomputers, as well as models of their Silent 700* Electronic Data Terminal Family.

*Trademark of Texas Instruments.

ANDERSON JACOBSON

ANDERSON JACOBSON, the country's first manufacturer of acoustic couplers and modems, also offers data communications terminals including Teletypes, the AJ 841 Selectronic TM terminal, the AJ 630 wide-carriage non-impact terminal, and the new AJ 832 keyboard printer terminal.

nci

"Considering the price of SLICK and its performance, there's no reason to pay more for a library system." Bob Martin – CHATTANOOGA ELECTRIC POWER BOARD.

SLICK, a true price performance source program library system, costs as little as $78.00 per month.

National Computing Industries

HEWLETT hp PACKARD

HP features the new 2644A Terminal (mini-data station) with twin-cartridge, integrated local mass storage. HP is also featuring the new MX/65 DISComputer, a powerful 21MX minicomputer and ultra fast 12962A disc subsystem. It's rugged, reliable – and the lowest-priced computer/disc team available from one manufacturer.

GENERAL AUTOMATION

A new family of advanced technology micro- and minicomputer systems – The Solution TM Series – will be displayed. Their use in data communications & data management applications will be demonstrated.

Consolidated Computer

"CONSOLIDATED COMPUTER will be displaying the new KEY-EDIT 60 key-to-disk system for small to medium sized users. More than a data entry system, KEY-EDIT 60 has powerful editing, processing and communications features to help distribute the data processing workload."

BEEHIVE TERMINALS

Beehive Terminals Super Bee 2, in a rack mount configuration, and the text-editing Edit Bee will join other Beehive video display terminals at Computer Caravan. Beehive Terminals will also feature its new user programmable "video computer" Brilliant Bee, and make a product announcement at Caravan time.

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Centronics 500D Printer Handles Different Forms Concurrently

HUDSON, N.H. – The 500D series of printers from Centronics Data Computer Corp. was designed for users who need to print two forms simultaneously, a spokesman said.

The printers and their forms-handling options allow users to interchangeably handle ledger-card, cut-form or continuous paper applications by changing a detachable forms-handling mechanism, Centronics said.

Centronics is offering the 500D series at three basic print speeds: 80-, 120- or 165 char./sec and at 10-, 12- or 16.5 char./in.

All 500D models include a 5 by 7 matrix, elongated boldface characters, a one-line buffer and an operator-changeable forms-handling device.

Prices range from $3,530 for a 588D with a cut-form front-feed device to $5,180 for a 501D with ledger-card and continuous-form capability.

Centronics 500D Printer

Centronics is at One Wall St., Hudson, N.H. 03051.

NMA Plans Sessions on COM

CHICAGO – Several sessions devoted to computer output-microfilm (COM) will be featured at the National Microfilm Association (NMA) annual conference in Chicago in April. Seminars will focus on COM in such areas as engineering, manufacturing and office and administrative systems.

Other conference sessions will be devoted to business COM recorders, graphic COM systems and COM software.

Further information is available from the NMA's conference department at 8728 Colesville Road in Silver Spring, Md. 20910.

Yale Considers More Than Price

(Continued from Page 27)

Monthly costs for 24-hour, seven days a week service ranged from $1,400/mo to a low of $760/mo, Freeman said.

But the computer center was interested in reducing these monthly costs still further by taking over some of the maintenance responsibility itself, leaving the vendor to provide parts coverage..

The compuer center has a lot of in-house technical skill, Freeman said. And "while we try to provide a maximum level of service, we felt we could tolerate the possibility of slightly increased downtime" in favor of a considerably lower monthly maintenance bill.

One of the computer center's subjective criteria was how the vendors would react to this type of proposal.

Intel was willing, which was one reason it was the final choice, Freeman said. The shared maintenance agreement with that vendor costs the computer center about $150/mo.

Service Panels Considered

The service and reconfiguration panels on the competing memory systems also figured in the final choice.

"While all the memory boxes had the ability to take segments (512K or 1,024K) of memory off-line, we felt it would be desirable to also be able to reassign the addresses associated with each memory segment," Freeman said.

This would allow the computer center to benefit from "MVS' capability to take failing pages out of service one at a time, provided those pages are not located in fixed supervisor storage areas," he said.

The alternative to using this capability "might be to take an entire segment out of service," he said.

Intel's relocation panel looked especially good from a human factor standpoint, Freeman said.

Exercised from Console

The Intel memory does not have a maintenance panel, as CMI's does. "We did not view that as especially relevant, however, because the add-on memory can be exercised from the 158's console," Freeman said.

The Yale computer center brought in 2.5M bytes of Intel memory in October under an agreement by which it sold 1.5M bytes of IBM memory to Intel.

Installation was "very smooth" and took seven hours, Freeman said.

OCR Unit Hand-Held

(Continued from Page 27)

As an optional feature, users may chose to code any input string of characters into any output string. Code conversions from keys mounted on the wand are also available, the firm said.

The Datawand can be purchased separately for interface with the user's terminal, or it can be combined with a terminal provided by Compuscan.

The recognition unit with one wand costs $9,000 to $15,000 depending upon the application.

Compuscan's address is 900 Huyler St., Teterboro, N.J. 07608.

Controller Runs 3330

(Continued from Page 27)

On a turnkey basis, Omnus will program the controller transparently to the operating system to accomplish sector packing for large data bases, sector record recording for high throughput and other special applications.

The Omnus disk controller is also field-upgradable to the Omnus-I/CU programmable communications processor and to Omnus tape controllers; the firm said.

Omnus is at Suite B, 1310 E. Edinger, Santa Ana, Calif. 92705.

Here's an easy way to improve your printing output.

If the quality of your printed output does not reflect the quality of your organization, or, if your throughput is less than it could be because your printers are down too often, Grumman has a low cost, easy-to-apply answer: just hook up an IBM printer to your system with our printer controller.

Our printer controller interfaces an IBM 1403 model -2, -3, or -N1 to a variety of computers (Burroughs, CDC, Data General, DEC, Digital Scientific/IBM 1130, Univac, Xerox, and others on request). The IBM 1403 printer has compiled an unsurpassed record for print quality and reliability in thousands of installations. Now you can have the same benefits without having an IBM computer. And at less cost than the IBM user, because our Grumman printer controller costs less than IBM's.

Are you considering a change in your system, such as an upgrade, or a change in manufacturer? You may find that for the same or less money you can improve your print quality and throughput with the IBM 1403 and Grumman printer controller, instead of the printer your computer vendor supplies.

For multi-vendor installations we can add a switch to your controller to allow you to connect the IBM 1403 to either of two different computers.

You can rent, lease or buy both the printer and controller. For full information, call or write Joe McDonough, Grumman Data Systems Corp., 45 Crossways Park Dr., Woodbury, N.Y., 11797. (516) 575-3034. Telex 96-1430. TWX 510-221-1842.

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DAY I – MONDAY, FEBRUARY 16

*9:30 - 12:30	*Applications; Manufacturing*
*9:30 - 12:30	*Applications; Service Industries*
*9:30 - 12:30	*Networks; Networking Revisited— Effect of New Facilities and Procedures*
*9:30 - 12:30	*Forum; Network Diagnostics*
*9:30 - 12:30	*Applications; Insurance*
10:00 - 11:30	*Workshop; Network Planning & Budgeting*
10:30 - 12:00	*Workshop; CPU's and DataComm Software*
*2:30 - 5:00	*Basics; System Planning & Administration*
*2:45 - 5:30	*Networks; Network Optimizing Techniques*
R3:00 - 4:30	*Workshop; Network Planning & Budgeting*
R3:00 - 4:30	*Workshop; CPU's and DataComm Software*
3:00 - 4:30	*Workshop; Communications Processors and Multiplexers*

** Signifies sessions with 30 minute break for reviewing exhibits and for refreshments*
R Signifies Repeat Sessions

DAY II – TUESDAY, FEBRUARY 17

R8:30 - 10:00	*Workshop; Communications Processors & Multiplexers*
*8:30 - 12:00	*Networks; Optimizing International Networks*
8:30 - 12:00	*Forum; Bringing DP Power Closer to the User — Role of Terminals*
*8:45 - 12:00	*Applications; Government*
*8:45 - 12:00	*Applications; Banking & Securities*
*8:45 - 12:00	*Applications; Energy Industries*
*9:00 - 11:30	*Basics; Data Transmission Services & Modems*
10:00 - 11:30	*Workshop; Network Implementation*
10:30 - 12:30	*Workshop; Remote-Batch and Data-Entry Terminals*
*2:30 - 5:00	*Basics; Data Terminals*
*2:45 - 5:30	*Networks; Minis in Distributed Networks*
*2:45 - 5:30	*Forum; Bringing DP Power Closer to the User — Role of Small Business Computers*
R3:00 - 4:30	*Workshop; Remote-Batch and Data-Entry Terminals*
3:00 - 4:30	*Workshop; Interactive CRT and Hard-Copy Terminals*
R3:00 - 4:30	*Workshop; Network Implementation*

** Signifies sessions with 30 minute break for reviewing exhibits and for refreshments*
R Signifies Repeat Sessions

DAY III – WEDNESDAY, FEBRUARY 18

R8:30 - 10:00	*Workshop; Interactive CRT & Hard-Copy Terminals*
8:30 - 10:00	*Workshop; Modems & Couplers*
*8:45 - 12:00	*Applications; Hospitals and Health Care*
*8:45 - 12:00	*Applications; Computer Services*
*8:45 - 12:00	*Applications; Retailing/Wholesaling & Distribution*
*8:45 - 12:00	*Networks; Optimizing Data Entry in Distributed Networks*
*8:45 - 12:00	*Forum; Rap Session on Distributed Networks*
*9:00 - 11:30	*Basics; Data Processors & Software*
10:00 - 11:30	*Workshop; Network Management*
R10:30 - 12:00	*Workshop; Modems & Couplers*
10:30 - 12:00	*Workshop; Data Transmission Services*
1:30 - 3:30	*Networks; Role of Remote-Batch Terminals in Distributed Networks*
R2:00 - 3:30	*Workshop; Data Transmission Services*
R2:00 - 3:30	*Workshop; Network Management*

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25	Service Industry (Auto Rental, Credit Card, Hotel/Motel)
	Financial
31	Banking
32	Insurance
33	Securities & Commodities
	Computer Services
41	Time Sharing
42	Information Retrieval
43	Time-Sharing Network
	Government
51	Law Enforcement – Federal or Local
52	Federal Agency (other)
53	State, County, Municipal Agency (other)
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81	Rail
82	Bus
63	Truck
64	Marine
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	Utility
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72	Gas
73	Water
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83	Other (including Specialized Data, International, Radio,Microwave, Telegraph, Cable)
90	**Consulting Services**
95	**Other**

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Hospital, Supermarket Share Unusual DP Relationship

By Steven L. Priest

Special to Computerworld

BROCKTON, Mass. – A hospital and a supermarket chain here are enjoying backup protection and lower costs by locating their identical computer systems side-by-side in the supermarket's warehouse.

Brockton Hospital prepares all its input on three IBM 129 keypunches and takes the cards five miles to its computer in a warehouse of the Brockton Public Markets (BPM).

The hospital chose this arrangement in 1971 when it decided to change from a shared hospital computing service to an in-house CPU.

The shared computer service was essentially satisfying the hospital's immediate needs, but the hospital's administration felt various long-range plans could only be satisfied by establishing either an in-house computer or through the use of a minicomputer tied in with a large time-sharing computer.

In essence, the hospital wanted to control its use of the computer.

The immediate problem of space and manpower was overcome when the BPM approached the hospital with a proposition for a joint computer effort that would be advantageous to both parties.

At the time, the BPM was considering expansion of its DP operation and had personnel and space available to accommodate such an arrangement. The hospital was having problems locating space on-site, it was also relatively inexperienced in DP operations.

The agreement reached with BPM allows the hospital to have its own installation, responsibility for its own systems work and programming and, to a large extent, responsibility for scheduling the work-flow through the computer.

Both BPM and the Hospital use 32K NCR Century 200 systems with Model 657 disks, Model 653 tape drives and a 3,000 line/min printer on each system.

The computers are located in the same room but are completely independent of one another. However, a switching device can connect the two systems if desired.

BPM buys all stock supplies and the hospital pays for their time.

Systems programming and data preparation, as well as all systems documentation and computer operating instructions, are the responsibility of the hospital.

Advantages of Agreement

The advantages of this agreement are:

- Two units with peripheral switching devices provide backup as well as preventive maintenance time so neither party is disrupted by downtime.
- Having one installation provides more efficient staffing.
- No space or overhead costs are incurred by the hospital.
- The BPM personnel are fully trained and experienced with the system and knowledgeable DP people are available for consultation. Also, applications can easily be implemented once programming has been completed.
- The BPM computer was available for testing the hospital's applications before its computer arrived.
- The hospital can acquire actual hands-on experience with in-house DP before the computer is actually installed at the Hospital.
- BPM can use the hospital's computer when it is having an especially busy day.

The only drawback to the agreement is that the hospital is not gaining experience in day-to-day computer operations. However, the hospital can perform these functions at any time under the agreement.

Since the initial applications did not demand instant turnaround time, the hospital feels the costs and time in traveling to the shared site is not significant.

It was agreed by both parties that once the hospital reaches maturity with respect to applications and personnel, a computer center will be established at the hospital.

In the meantime, the Brockton Hospital is paying about as much as it did for the dial-up computing service and has been able to launch many more money-saving applications.

Priest is manager of data systems at Brockton Hospital.

ABR Device Handles NC Tape Preparation

NEW YORK – A numerical control (N/C) tape-preparation machine which can be set up as an off-line unit for in-plant use or connected by telephone to a service bureau is available from ABR Corp. here.

The Tape-Prep was designed for use with machine tools, computers and automatic typesetting equipment using numerically controlled tapes. It can also be used as a teletypewriter terminal for graphic arts and communications systems.

The Tape-Prep incorporates a teleprinter and is compatible with domestic and foreign NC machines, including both continuous-path and multiaxis types.

It will code 1-in.-wide, eight-channel EIA tapes and can be equipped for Ascii coding or combinations of EIA and Ascii.

The ABR Tape-Prep comes in three models, the standard Ascii-coded TP-1; the TP-2, coded for all functions to work in the EIA RS-232 code system for all domestic and foreign NC machines; and the TP-3, coded to operate in all functions in Ascii, EIA RS-232 or any other code specified.

The TP-3 also can be used as a converter to read in EIA and punch in Ascii or vice versa. All options permit simultaneous printing.

The basic tape preparation center, including tape reader, punch and printer, costs $2,250 from the firm at 262 Mott St., New York, N.Y. 10012.

Selectrocard Badge Reader Serially Scans Credit Cards

MAMARONECK, N.Y. – The Sealectrocard 12 by 10 badge reader provides the interface, code conversion and serial scanning capabilities for credit-card processing and other applicatons, according to its vendor, Selectro Corp.

The reader, available with field-replaceable contacts and a choice of terminations, is also suited for instrumentation and library recording systems, process control, personnel identification and medical instrument reading, the company added.

The device costs $155 from Selectro at 225 Hoyt St., Mamaroneck, 10543.

Introducing the industry's most advanced 100/200-megabyte OEM disk drives.

ISS 733-10/11 — benefits for all.

The new ISS 733-10/11 disk drives are, by far, the most advanced random access mass storage devices ever designed for the OEM market. Their numerous features are designed to benefit both you and your customer. For example, the 733-10/11 offer exceptional speed in both head positioning and start/stop times. Compactness, advanced sound insulating, and waist-high pack loading are just a few of the additional design considerations. The big news, however, is the 733-10/11's field-upgrade capebilities. ISS 733-10, with a 100-megabyte capacity, can be easily field-upgraded to 200 megabytes. Or the 200-megabyte capacity is available immedietely with ISS 733-11. In addition, either unit can be ordered with, or field-expended to, dual port capability.

Advanced interface design for extended compatibility.

The advanced design of the ISS OEM interface permits functional compatibility between ISS 733-10/11 and most current model 40, 80, 100 and 200-megabyte drives. As a result, controller modifications are minimal.

ISS designed-in performance features:

Standard power supply — The integral power supply is designed to tolerete wider variations of AC power, greatly reducing susceptibility to powerline brownouts.

Module select plug — Permits added flexibility in disk address assignments in multi-drive systems.

Data separation and write data precompensation — All read/write data encoding and decoding is performed in the drive.

Absolute cylinder addressing — Simplifies programming by performing disk addressing functions in the drive which are normally performed in the controller

Industry standard media — 3336 end 3336-11 or equivalent disk packs.

Programmable sector mark — Allows user to pre-select sector size to suit his specific application.

Important extra-performance options:

Dual port — ISS 733-10/11 can be upgraded from single to dual port in the field. Or, if you prefer, dual port can be factory installed prior to delivery.

Sector counter — Permits system to interrogate which data sector is approaching the read/write heads.

Rotational position sensing — Increases system throughput by signaling to the using system when the desired sector is approaching the read/write heads.

Address mark format — Specifically for those who require variable record lengths on their systems.

Daisy chaining — Dramatically reduces cabling requirements.

Capacity upgrading — 100 megebyte to 200 megebyte.

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ISS maintains e complete support facility for all its customers. Spere parts and technical assistance are available round-the-clock and are as near as your phone.

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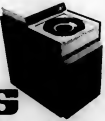
We would like to give you more information about the ISS 733-10/11 and their many advantages. Just write or call ISS marketing, 10435 N. Tantau Avenue, Cupertino, CA 95014, (408) 257-6220. ISS is en operating unit of Sperry Univac.



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Special to Computerworld

CRANFORD, N.J. – A minicomputer system is helping Reel-Strong Fuel Co. here reduce costs, boost profits, improve customer service and increase cash flow.

The recently installed system "is already proving itself in a business that has a high number of daily variables," according to Clint Crane, Reel-Strong's president.

The firm switched from using a computer service bureau for its accounts receivables to a minicomputer system that now processes – in addition to the accounts receivables – invoicing, aged receivables, accounts payable, sales analysis, daily transactions and all general accounting applications.

The daily computation of carrying charges alone is helping to recover the cost of the system, the firm said.

Crane explained that he now has a full-time system as opposed to the part-time service bureau and that the system does all the necessary functions as well as provide him with an equity buildup.

The system consists of a Wang WCS/30 minicomputer, a 200 char./sec printer and one CRT terminal that is tutorial – an operator gets instructions from the TV screen on the terminal.

Reel-Strong leasea the system for $750/mo, which includes the hardware equipment plus all software programming and maintenance.

The system performs the administrative functions that were previously done manually and does them approximately 30% faster, the firm estimated.

Routes Delivery Trucks

Each day delivery tickets are printed and coded into geographical zones; run-out suspects are predicted based upon past consumption and estimated future needs.

Account information is tailored to credit limits, carrying charges and special handling and delivery instructions.

A request for a delivery forecast is the first activity for the mini. The forecast is complete within 10- to 15 minutes and then a request for all delivery tickets of customers the system has pinpointed as requiring deliveries is punched. This can be done by geographical zones and also takes 10- to 15 minutes; the day's tickets and routing are then complete.

The daily delivery forecast is alerted in advance when an account has reached or will exceed its credit limit with the predicted oil delivery. The customer's current balance as of the day before and his established credit limit is given on each forecast and printed on each delivery ticket.

Updates Accounts

The system is then used to put in all deposits from the previous day and update all accounts. A current balance is available by 10 a.m., the firm said.

An operator then enters all oil delivery charges from the previous day and the system again updates the accounts and prints invoices.

At any time during the day, anyone can enter information, such as service charges, both billable and nonbillable, and the computer updates each account. Reports can be generated in minutes, Crane said.

The system also deletes customers when required, but retains the listing in the master file until the outstanding balance is zero, he added.

Comparative Reports

Comparative reports such as sales by month, day and year, sales comparisons with past time periods and consumption analysis and comparisons with similar time periods can be generated by the system.

A preprogrammed application package for fuel-oil dealers was designed by MIS Associates of Mount Holly, N.J., and Wang.

Getting the system operational with the software package, including whatever training was necessary, took about three weeks, Crane said.

It took two weeks to transfer his files to the minicomputer plus the equivalent of about four days training.

Firm With Mini Puts Inventory Control On-Line

By Esther Surden
Of the CW Staff

DENVER – The inventory control and accounting applications of an aircraft firm here have been put on-line through the use of a minicomputer.

Denver Beechcraft previously used a "strictly manual system, with pegboards and hand-posting," according to T.F. Liotta, the firm's subsidiary business manager.

When tighter control and more timely data were needed for part-reordering purposes, the firm decided to computerize.

"We looked at NCR, IBM and some local companies that would coordinate both the system and the software, but our parent company, Beech Aircraft Corp., was looking for something to use nationally," Liotta said.

The firm decided on an NCR 8200 because it felt that, "for the money, there was much more system and software."

If the installation at Beechcraft is successful, other 8200s will be installed at Beech Corp. headquarters in Wichita, Kan., and at four other subsidiaries, Liotta said.

The NCR 8200 system, installed last August, has a 32K word CPU, dual-disk drive and a 200 line/min printer.

In addition to the CRT that serves as the control console, there are two others, one in the parts department for the entry of stock depletions and the second in the accounting department.

Handles Payroll

The mini handles the payroll for 60 people, keeps track of a stock of about 4,000 parts and generates 250 invoices monthly with an average of 10 line items each. The firm is leasing the system for about $1,600/mo, including maintenance, Liotta said.

No new personnel were hired when the computer was installed, according to Liotta. Employees were trained both in-house and at NCR's training school, he said.

Operators were sent to school for one week and CRT input clerks were trained in-house with NCR support. "NCR is giving us good training and software support," he added.

Because the firm does extensive repair and overhaul work for Beech aircraft owners, the mini will also be used to track job costs, with monthly reports of material and labor identified by individual job.

The resulting tighter control should permit management to question deviations from operation standards which previously could only be charted by time-consuming manual computation, Liotta said.

Operating Systems Topic of IEEE Course

LOS ANGELES – A course on "Minicomputer Real-Time Operating Systems" will be held at the Roger Young Center here on March 15 by the Institute of Electrical and Electronics Engineers (IEEE).

The course was planned to familiarize engineers with real-time operating systems from an application point of view.

Registration is $65 for IEEE members, $30 for student members and $75 for nonmembers. Information is available from the Educational Registrar, IEEE, 445 Hoes Lane, Piscataway, N.J. 08854.

Tycom Cuts Price of 9800

FAIRFIELD, N.J. – Tycom Systems Corp. has reduced the price of its I/O typewriter terminal for the Hewlett-Packard 9800 series of programmable calculators.

The reduced price of $1,776 is a special "Bicentennial" offer, the firm said. The previous list price for the Tycom 9800 was $2,050.

Tycom is at 26 Just Road, Fairfield, N.J. 07006.

General Robotics T/S Systems Configured Around DEC PDP-11s

HARTFORD, Wis. – Two minicomputer-based, general-purpose time-sharing systems, the MUS/11 and the TSS/11, have been introduced by General Robotics Corp. here.

The MUS/11 features a Digital Equipment Corp. PDP-11/04 processor with 28K words of Monolithic Systems memory, four TEC, Inc. Model 2400 formattable CRT terminals, an Advanced Electronics Design (AED) Model 2200 2.5M-byte cartridge disk, an AED Model 3100 IBM-compatible floppy and a Centronics 306C printer.

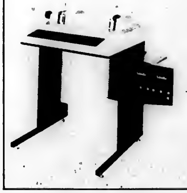
Software for the system includes the DEC RT-11 foreground/background operating system. Programs for document preparation, CRT-oriented text and data entry and data base management are also included with the system, which costs under $45,000 the firm said.

The TSS/11 was designed for installations requiring a larger data base, support for more users or multilanguage capabilities for all users, General Robotics said.

The system consists of a DEC PDP-11/35 mini with hardware multiply/divide, 128K words of Monolithic Systems memory, eight TEC 2400 CRTs, an AED 70M-byte disk, a four-drive AED floppy and a Centronics 104 line printer.

Using the Omsi-RT software package, users can run programs under DEC's RSTS/E and RT/11 opersting systems, the firm said.

TSS/11 costs under $100,000 and both systems are available in 60 to 90 days from the firm at 57 N. Main St., Hartford, Wis. 53027.



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Dedicated Mini Used to Study Efficient Use of Lumber

By Esther Surden
Of the CW Staff

MADISON, Wis. – The U.S. Forest Service is using a dedicated minicomputer in a research project designed to help industry use lumber more efficientiy.

The system, based on a Harris Corp. Model 6024/3 with 16K words of memory, teleprinter, two magnetic tape drives and a line printer, is being used with an experimental ultrasonic scanner developed by the Forest Products Laboratory here to instantly size up a log and choose the best place for a sawyer to make a first cut.

"The project is concerned with automating the sawing and decision making in saw mills," a Forest Service spokesman said. "It will hopefully increase the efficiency and utilization of lumber.

"We are fast coming to a stage where the only way to meet the demand is to cut down more timber, and our supply is not able to meet the demand."

Formerly, a sawyer simpiy made an educated guess about where to start his work on a log. According to the U.S. Forest Service, lumber yields in most sawmills using the "eyebali" method vary about 20% from any given log.

Since any mill can be assumed to make, by chance, an opening cut somewhere between the low and high extremes, the computer method should provide an average improvement of 10% – a potential savings of about 112 million cubic feet of lumber in the U.S., the service said.

Basically, the minicomputer controls a scanner, connected to two transducers that make several passes over a piece of lumber. The time that it takes the sound to pass through the board is recorded on magnetic tape.

The scanner can "look through" boards to spot both visible and invisible faults in the wood. Using the data, the mini outputs sawing instructions making sure that maximum-quality lumber is produced from the logs or that clear wood cuttings come from the lumber.

Software for the system includes Harris scientific application packages. Other application and systems programs are written in-house as a more complete system is developed.

Four people work with the system, the spokesman said. Personnel include the project director, a forester with an interest in computers who writes system software, a geologist and an electrical engineer, both of whom know computers and have been able to write programs in Assembly language for the system.

Mini a Development Tool

The fully developed system will probably not use a minicomputer, a spokesman said.

"We are aiming toward a system with a scanner that can pass over the full width of a board, and we are developing equipment that can run the boards through at a full production speed of 100 ft/min. The minicomputer-based system we are using now is an excellent development tool."

In its final form, the system will be incorporated into sawmill operation, making the grading decisions based on the location of clear vs. defective areas in each piece of wood.

2200 Gets Recorder

NEWTON UPPER FALLS, Mass. – An off-line device that accepts data from analytical instruments on a continual basis and stores the data on tape cassettes is available for Wang Laboratories 2200 series computers, according to Memodyne Corp.

Model 2181W digital tape recorder accepts Ascii and/or serial RS-232 data at input rates up to 1,200 bit/sec, formats and buffers the data and writes it on a certified digital cassette.

The unit costs $1,695 and delivery is available within four weeks from the firm at 385 Elliot St., Newton Upper Falis, Mass. 02164.

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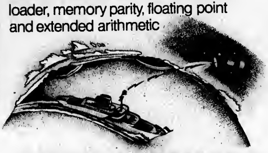

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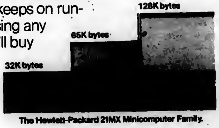

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Determines Generator Performance

Real-Time Control System Works to Avoid Blackouts

By Mal Stiefel

Special to Computerworld

HOUSTON – A system at the Houston Lighting & Power Co.'s Energy Control Center (ECC) is controlling electric generator performance and monitoring transmission system operation in an effort to maximize efficiency and keep downtime at a minimum.

The system, in operation for the past four years, gives personnel the information they need to avoid citywide blackouts, like the infamous "Northeast Blackout of 1965."

Running 24 hours a day, a pair of Xerox Data Systems Sigma 5 computers gather and display data every 10 seconds from 160 power substations and 10 generating stations scattered around the Houston area so outages on individual lines can be noted immediately for response by service personnel.

At the same time, system frequency is monitored at two-second intervals and generator loads are adjusted to match system demand.

Four Subfunctions

At 30-second intervals, participation factors are assigned to each generator to take advantage of the load vs. efficiency characteristics of the various units being used at any given time, according to ECC manager Charles Ham.

The automatic generation control function involves four subfunctions: load forecast, unit commitment, economic dispatch and frequency control.

The load forecast program is run in background each day to predict the total power demand that will be placed on the system at each period of the following day, depending on the time of year, the day of the week and such variables as weather, which may influence the use of air conditioners or heating units by the utility's customers.

Then the unit commitment program is run to recommend the mix of participating generators, selected from the 50 units in the company's network, needed to handle the load in each hour for optimum use of fuel.

The list may be modified by supervisory personnel if, for example, a recommended unit is scheduled for maintenance. To support the analysis of alternatives, another batch program, called the load flow program, can be used to determine the impact on the system of a change in the availability of generators or an outage of one or more transmission lines.

Some of the older generators in the system are reasonably efficient only when the are operating at their full rated load; these units won't be run at all if they can't be fully loaded, Ham explained.

Other newer units can still product electricity efficiently under partial loads, he noted, so these operate under real-time control of the economic dispatch program, which tries to distribute the load in proportion to the units' generating capacities.

Every 10 seconds the computer polls each substation in the power distribution network over a 1,200 bit/sec communication channel; the substation responds with the status of each of its incoming circuits and each of its outgoing feeder lines. The status of each individual circuit is displayed at the ECC.

If a given substation fails to report, another polling message is issued by the computer. If there is still no response, the substation status display is changed and ECC personnel notify the service crew of the problem.

Similarly, if the substation report indicates problems with some lines, the service crew is dispatched to investigate.

By noting the pattern of outages, ECC personnel can take corrective action through remote control of circuit breakers and switches to shut down parts of the transmission network and to reroute power through other lines in order to keep from interrupting service.

Even if a circuit is out for a short time, service personnel patrol the line to find the cause.

If the service crew determines a line must be taken down for emergency repair (or routine service), an operator enters a command for the computer to issue a "clearance tag" for the given line to inhibit any further use of the line. This prevents the computer from addressing any circuit breakers or switches on the line until service personnel determine the clearance order can be removed; the line then can be placed back in service.

Shared Memory

The system, including one display console for the automatic generation control function and two consoles for the system operation function, was built by prime contractor Leeds & Northrup.

Display terminals and most of the software, written in Fortran and Sigma 5 machine language, were supplied by subcontractor Philco-Ford.

Each computer has 32K words of main memory and a drum (one with 4M bytes, the other with 1.5M bytes). The machines also share 16K words of main memory and a common 8M-byte drum; this permits one of the processors to take over the entire task when the other goes down.

Peripherals include a card reader, card punch, a printer and two magnetic tape units.

Houston Lighting & Power provides maintenance of hardware and software on its own; technicians were trained by Xerox when the system was installed.

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To Reduce Paperwork

Army Beginning Automated Enlistment Pilot Program

BALTIMORE – The Army will begin operating a computerized enlistment system this month at the Armed Forces Exsmining and Entrance Station (Afees) here.

The installation is a pilot operation preparatory to the sutomation of some or all of the 65 other Afees centers across the country. Together, the centers process about 800,000 young men and women into the armed forces each year.

The first visible result of the system will be a drastic reduction in the number of forms enlistees will have to fill out. A Digital Equipment Corp. PDP-11/40 mini will prepare these – including test-tube labels, travel orders and the enlistment contract itself – using information stored in a data base.

But the system is expected to do far more than simply save applicants' time in filling out forms. Other anticipated benefits include less paperwork, enabling the center to process a larger volume of people with the same staff and greater accuracy in the information recorded.

Since up to 300 pieces of information on each individual may be handled as many as three times in the enlistment process, manual transcription of this information allows considerable opportunity for error.

Also, by analyzing information in the data base, the Department of Defense will be able to simulate the effect on enlistments of changes in requirements such as hearing level, eyesight and other standards.

The system should make less training and memory work necessary for Afees personnel. The enlistment regulations for each branch of service have been programmed into the system.

In addition, the system will automatically flag various types of unacceptable conditions as the would-be enlistees move through the examination process.

The Baltimore center serves the tristate area surrounding Washington, D.C. Between 100 and 200 potential recruits for the Army, Air Force, Navy and Marine Corps pass through the center each day, according to Major Roy Kimerling, station commander.

System contractor for the project, known to the military as Automated Afees, was Computer Sciences Corp. (CSC). The company's Systems Division designed the system, provided the necessary hardware and software and is training Afees personnel in its use.

In sddition to the PDP 11/40, the system includes a CRT terminal by Beehive Medical Electronics, Inc., a DEC data entry display badge reader, a Hywriter electric typewriter by Data Terminals and Communications and a General Electric (GE) Terminet 300 terminal.

The programming language used is Mumps, developed by Massachusetts General Hospital.

"This is a basic data handling and computer service system," said John S. Fondrk, CSC project manager. "Development meant taking standard equipment and integrating it with computer programs that would give the Afees people the flexibility they need in gathering data on enlistees, while relieving them of as much tedious and repetitious activity as possible."

Designed for Expansion

CSC designed the system for expansion in a number of areas, such as the preparation of budgets, financial reports and personnel reports, Fondrk said. Other potential uses are to administer mental and vocational tests to applicants and to accept data directly from automated medical and laboratory instruments, he sdded.

Before an applicant arrives at the station, information is entered into the computer data base. This includes the branch of service for which he is applying, age, sex, examinations and processing to be performed and prior military service.

A plastic badge is also produced, showing the person's name and coded identification number. The computer also prints a batch of pressure-sensitive labels, each bearing some relevant information about the applicant.

Upon arrival, the applicant picks up his packet of badge and labels, which he carries from stop to stop along the examining chain. At each examination point, Afees personnel insert the badge into a badge-reading device which then displays a visual request for specific processing information, such as medical test results. The staff key the data into the system, which stores it in the data base.

If, for instance, dsta keyed into the system shows the applicant to be heavier than the sceptable weight for his height, an asterisk will be printed next to the information on the hard-copy report of the examination, for special attention by the examing physicisn or other staff personnel.

The system uses an Optical Scanning Corp. mark reader to scan answers to mental tests. The system then computes and records the final scores from the raw data. Again, data that falls outside the area of tolerance is flagged.

For applicants who successfully complete the examinstion process, the system prints an enlistment sgreement ready for signature and types out the appropriate travel orders.

At the end of each day, Afees personnel transmit data on each person processed to headquarters of the U.S. Army Recruiting Command at Fort Sheridan, Ill., via telephone circuits.

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Analysts Ponder the Question

DEC Stepping Into Commercial Marketplace With 20?

By Molly Upton
Of the CW Staff

With the recent introduction of the Decsystem-20 [CW, Jan. 19], Digital Equipment Corp. has gained the potential to expand out of its traditional market for time-sharing equipment and into the commercial arena, industry analysts believe.

But will DEC have the field support and software to follow through? Or will it indeed restrict itself to enlarging its share of the time-sharing market already occupied by Decsystem-10s?

From the viewpoints of hardware and market appeal, Oscar Rothenbuecher thinks "it's a very good offering."

The senior staff member of Arthur D. Little's Information Systems Group believes a key element to the success of the system will be the hand-holding provided by DEC to get the Decsystem-20s installed in the commercial environment rather than in specific time-sharing environments, where DEC has excelled in the past.

Jim Peacock, editor of International Data Corp.'s *EDP/Industry Report*, said "we have to read into the 20 announcement the awareness by DEC that it is increasingly having to compete more in the general DP market place."

DEC denies this to some extent, Peacock said, noting Ken Olsen, DEC's president, said the company is not trying to meet IBM head-on.

"It looks as though DEC has tried to find another niche for a product," Peacock said. "It is definitely saying there's a piece of the general-purpose environment it can get without ruffling too many feathers."

To meet IBM in the commercial arena, Rothenbuecher added, would be "difficult for DEC because it would require a more extensive field support organization."

Another observer agreed. "DEC really does seem to be committing itself in the commercial direction. The 20 certainly is an interesting machine for commercial business use."

But "DEC is going to have to come up with a lot more software to consolidate that direction," he added.

Small Users a Possibility

One possible market area could be the small users who have become accustomed to time-sharing through the use of services, the observer said. DEC will probably try to convert some users time-sharing, he added.

With the Decsystem-20, DEC has tripled or quadrupled the possible target area for Decsystem-10s, he believes, since there doesn't seem to be much competition in that price range.

"It was apparent that low price was a design criteria, and it would appear to be a valid approach going with a tried operating system and some new types of hardware where possible," Peacock said.

Rothenbuecher commented "DEC is trying to provide the capabilities which are of the same nature as the Decsystem-10 at a lower price but utilizing as much as possible the software it has.

"The features of the system are not as extensive as the Tops 10 operating system, but these restrictions seem to be less than the cutdown in price," he added.

It is likely DEC will broaden its position in the specific dedicated-type application market already occupied by Decsystem-10s, but with the limitation that it is not in the general-purpose business field. To do that it would have to expand field operations, Rothenbuecher said.

However, should DEC decide to market toward specific industries, it would have to develop more industry-oriented expertise in its systems, the software that supports them and its field force rather than leaving users to do their own software or to subcontract with a software house, he said.

Another observer agreed, although he conceded it is possible DEC will leave the applications software up to software houses, as it has for other systems. The company may also sell this machine through its time-sharing OEMs as it has the PDP-11/70, he added.

DEC Defines Market, Plans to Beef Up Support

By Patrick Ward
Of the CW Staff

MARLBORO, Mass. – "There's no question we'll be competing more often with IBM in the small to medium-sized shops than we have in the past," Bill Kiesewetter, Digital Equipment Corp.'s Large Computer Group product line manager, said after the recent introduction of the Decsystem-2040 [CW, Jan. 19].

The Decsystem-2040 is clearly aimed at a more commercial marketplace than either the large-scale Decsystem-10 or PDP-11 lines, he added.

The mid-range, 64K to 256K (36-bit word) system is not intended for the batch-only user, but for DP shops that want to combine batch and interactive work, Kiesewetter said.

Judging from the market research reports DEC officials brandished at the 2040 announcement, the company feels this type of user will make up more and more of the market.

"If those trends continue," Kiesewetter said, "the machines we're competing with will run into architectural limitations in providing the sort of interactive capability users want."

Users who desire a data base inquiry capability constitute another Decsystem-2040 market, he said.

Small colleges, universities, school districts and municipal governments are other sales areas, Kiesewetter said. So are engineering companies and departments and hierarchical networks.

Another interesting area, Kiesewetter said, is the IBM System/3 replacement market.

"The transition from a System/3 to a 370 is not an easy one," he noted. "This is especially true if the users want data communications capability."

The Decsystem-2040's price competitors include IBM's 370/115, 125 and 135; Univac's 90/30, 90/60 and 90/70; Honeywell's Level 62 and 64 series; and Burroughs 2700 and 3700, DEC said.

Kiesewetter also sees the Hewlett-Packard 3000 as a competitor for the bottom end of the Decsystem-2040's market. "Its general-purpose, interactive multiprogramming software resembles what we offer," he said.

However, the 32-bit 'megaminis' from Interdata and Modular Computer Corp. (Modcomp) are no competition at all, in Kiesewetter's view: "They're still in the iron market."

Support Extension

In line with its plans to increase its markets DEC will increase the size of its field support staff about one-third this year and perhaps more than that next year, Kiesewetter said.

The company is training its Decsystem-10 support people on the Decsystem-2040 so "they can do double duty," he added.

DEC also expects the Decsystem-2040's built-in minicomputer will speed both local and remote diagnostics. The company is forecasting a mean time to repair of one hour once the service person is on-site.

On the software support side, DEC plans to develop a bill-of-materials processor for manufacturing firms, Kiesewetter said.

The company also plans to expand its program of certifying and distributing customer-developed educational applications software.

Full remote job entry support will be available in the fall, Kiesewetter added.

The success of the Decsystem-10 line of large-scale machines prompted the introduction of the Decsystem-20, Kiesewetter said.

DEC has shipped about 450 of its large systems, 100 of them in the last year, he noted.

The impact of the 20 series on 10 sales will be "minimal," he said, since they are in different price and capability classes.

Jump in Sales Boosts IBM Net 32% in Quarter, 8% for Year

ARMONK, N.Y. – A banner fourth quarter for outright sales helped boost IBM's 1975 earnings more than 8% above the 1974 figure to a record $1.99 billion. Quarterly earnings rose a whopping 32%.

For the nine months, IBM's earnings were up less than 1% over those of the previous year-ago period.

The fourth quarter earnings and revenues, which set a record for any quarter, showed an increase of almost 44% in outright sales to $1.52 billion.

Earnings from 1975 U.S. operations alone dropped almost 4%, despite a more than 6% increase in domestic revenue.

Earnings from foreign operations rose more than 20% from 1974 and comprised nearly 56% of total 1975 earnings.

Foreign revenues for the year edged over 50%. This marked the first year in which foreign revenues contributed more than half of IBM's revenues, Chairman Frank T. Cary observed.

Sales of DP equipment increased each quarter from a relatively low amount "to a record high in the fourth quarter, with the total for the year 1975 slightly exceeding the previous record amount of 1974," Cary said.

Fourth-quarter sales rose nearly 44% to $1.52 billion. For the year, the figure rose more than 6% to $4.55 billion. Sales had been off more than 6% through the first nine months.

"However," Cary said, "the accelerating trend in these purchases experienced during 1975 is not expected to continue.

"Shipments were below 1974's record pace," Cary continued. "Incoming orders improved as the year progressed and for

(Continued on Page 40)

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RCA Tells U.S. vs. IBM Trial

Timing Limited Spectra Compatibility With 360 Line

By Edith Holmes
Of the CW Staff

NEW YORK – RCA Corp. intended its Spectra series to be as compatible as possible with IBM's 360 line when both sets of machines were in the planning stages in late 1963 and early 1964. However, because of internal pressures at RCA to announce the series, Spectra turned out to be only applications program-compatible with the industry leader's mainframes, a government witness told the court hearing the U.S. vs. IBM antitrust trial here recently.

RCA would have preferred its CPUs to be I/O interface-compatible with the 360 series as well, Arthur D. Beard, former chief engineer of the EDP Division at RCA, said.

But specifications for the interface were not included in the IBM announcement of the 360 in April 1964, and "no one at RCA felt time could be lost in coming out with Spectra," he added.

Spectra had to be introduced almost simultaneously with the 360 line if RCA was to remain competitive with IBM, Beard said.

Called to testify about RCA's experience competing with IBM in the computer business, Beard was also asked by IBM counsel to answer questions about the success of his present company, Formation, Inc.

Currently chief executive officer of the New Jersey-based firm, Beard worked for RCA from 1961 until 1970 and was responsible for determining whether program compatibility between RCA's Spectra series and IBM's 360 line was technically and economically feasible.

Beard focused on IBM's announced 360 plans when designing the Spectra series in 1963-64. "RCA's theory was it could become a second source of mainframe manufacture for 360 user programs," he said, adding the company obviously felt there was a definite marketplace for such an animal.

"RCA believed users would recognize the advantages of purchasing from two manufacturers whose machines were essentially applications program-compatible."

The former RCA engineer noted, however, that the company never attempted to make its Spectra operating systems software-compatible with IBM's machines.

RCA also knew more 360s than Spectras would be sold, he said, adding that the industry leader's market share was then in the neighborhood of 70% while RCA's was hovering around 2% to 3%. RCA wanted both to be Number 2 in the industry and to achieve a 10% market share, according to Beard.

Disadvantages of Compatibility

"There were disadvantages in trying to be compatible with IBM," Beard continued. "We made it possible for RCA users to leave the RCA camp and go with IBM," but decided this risk was necessary if RCA was to increase its market share.

By being compatible with IBM user programs, the entire RCA system tended to be compared with comparable IBM devices by the user, Beard said.

RCA's Spectra models 70/45 and 70/55 were designed to perform 30% to 50% better than the 360/40 and 360/50, respectively, he said.

Government attorney Peter Goldberg's questions on the degree of compatibility between the Spectra and 360 series dealt with the I/O interface as well.

Beard testified that the final specifications for the Spectra series – and particularly for the interface – were not made until RCA had learned more of the technical details of the 360 series in the April 1964 announcement.

Beard was confused as to the exact timing of IBM's compliance with RCA's request for the I/O specifications, and the defense eventually produced documents from IBM files relating to the exchange of information between RCA and IBM on the matter during its cross-examination effort to discredit Beard's testimony.

According to those letters and agreements, RCA had the input/output information by July 15, 1964. But by then RCA had had to go ahead with the design of the interface, Beard said.

The defense also sought to cast doubt on Beard's assertions of RCA's commitment to the computer industry, its real contributions to magnetic core memory and transistorized computers and its belief that many users feel safest going with IBM equipment.

Beard did say RCA had put more resources overall into the development of its color-television business.

Experiences at Formation

Finally, IBM counsel focused on Beard's current experiences at Formation. All those who formed the company came from RCA. Within a year, the new firm's goal was to pursue the end-user market in such a way as to enhance older systems with up-to-date peripheral subsystems.

Formation knew the plug-compatible manufacturers were having a difficult time because of competition from IBM in the form of lowered prices and so decided to avoid this area of the marketplace, Beard said. The company further decided it would not compete head-to-head with IBM.

Beard added that Formation is too small to present any challenge to IBM except in very small, narrowly defined market areas. He also noted that the company has no plans to compete in the broad computer systems marketplace, despite the fact it has developed a CPU called the 9903 which is already installed at Southern Bell Telephone Co.

The defense then showed that Formation had competed with IBM for full-system contracts on three separate occasions and had won the $12.5 million bid for Southern Bell from IBM and Univac. Formation is now fully occupied in satisfying its contract for the 9903 system for the phone company and has no immediate plans to bid on another large system at present, Beard said.

It is conceivable, though, that Formation will meet IBM again, Beard said.

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Burroughs Income Growth Outpaces Sales 25% to 11%

DETROIT – Burroughs Corp.'s 1975 earnings growth outpaced revenues 25% to 11% as the firm scored record earnings and revenues for the year and fourth quarter.

Worldwide incoming orders for the year rose 8% over those of 1974.

Incoming orders during the fourth quarter grew 25% over those of the year-ago period and were the strongest in any of 1975's quarters, the firm said.

Orders for commercial products jumped 38% over the same 1974 quarter and business minicomputers as well as the large and very large computer systems were particularly strong, the firm said.

Earnings for the firm during 1975 rose to $164.4 million or $4.14 a share compared with nearly $132 million or $3.38 a share as restated for last year.

The 1974 earnings were restated to reflect a change in accounting for overseas operations as required by the Financial Acounting Standards Board.

Revenues for the year grew to $1.702 billion compared with $1.532 billion in 1974.

Rental and service revenue rose 19% over 1974, while outright sale of systems and products increased 6%.

During the fourth quarter, earnings jumped 30% to $69.1 million or $1.73 a share compared with $53.3 million or $1.37 a share in the year-ago quarter.

Revenues for the period rose 14% to $552.3 million compared with $484.1 million in 1974.

Backlogs at year-end 1975 were a record $1.311 billion. A downward adjustment was made to the year-end 1974 backlog of $200 million, which represents orders for equipment that may not be deliverable, based upon customer-requested delays and delivery stretchouts which occurred in 1975 for orders received prior to 1975, Chairman Ray W. Macdonald said.

The principal effect on revenue of this adjustment of backlog has already occurred in 1975, and the effect on revenue for 1976 and subsequent years is not expected to be significant, he said.

IBM Net Jumps 32% in Quarter, 8% for Year

(Continued from Page 37)

the full year showed a small increase over 1974. The backlog at year end is virtually unchanged from 1974."

Year's Earnings

During the year, IBM earned nearly $1.99 billion or $13.35 a share compared with the previous record of $1.838 billion or $12.47 a share in 1974.

Revenue for the year rose almost 14% to $14.437 billion compared with 1974's record $12.675 billion.

During the quarter, earnings jumped 32% to $488.6 million or $3.94 a share compared with $446.5 million or $3.02 a share in the year-ago period.

Fourth-quarter revenues climbed nearly 24% to $4.068 billion compared with $3.288 billion in the year-ago period.

Earnings for the 1974 fourth period, which incorporated a substantial, undisclosed sum for the costs of an early retirement program, were nearly 5% below those of the same 1973 period.

Although the year-ago charge would tend to make this quarter's performance look large in comparison, the 1975 fourth-quarter earnings were nearly 19% above the firm's best previous quarterly profit, $495.2 million earned in 1975's third quarter.

Uneven Performances

The strong fourth-quarter showing comes at the end of a string of somewhat uneven quarterly performances.

Compared with year-ago periods, the first-quarter earnings rose a little over 1%, dropped almost 3% in the second quarter and rose almost 4% in the third.

Rental and service revenue rose slightly more than 14% in the fourth quarter to $2.54 billion, which dragged down the annual average increase to under 18% or $9.891 billion. During the first three quarters, the rate of increase was more than 19%.

Foreign, U.S. Net

Foreign earnings for the year rose to $1.11 billion from $919.8 million in 1974, while foreign revenue climbed to $7.17 billion from $5.95 billion.

Earnings from U.S. operations dipped to $884.2 million from $917.8 million in 1974, despite an increase in revenues to $7.17 billion from $6.73 billion last year.

Other income, principally interest, rose almost 6% for the year to $360.5 million despite a fourth-quarter decline of more than 8% to $109.5 million.

The decline resulted primarily from the effect of revaluing some investment securities at the lower cost of current market value as well as from generally lower interest rates, a spokesman said.

DP Leads Industries in '75 In Introducing Products

CONCORD, Mass. – The computer business generated the greatest number of significant new products of any industry during the year ended May 1975, according to a study by Marketing Development here.

The report showed the number of new products introduced by firms listed on the New York Stock Exchange during the year dropped 26% overall from the previous year.

Communications equipment, except telephones, came in second with 132 new products compared with 144 for computers and auxiliary equipment, according to the report.

Marketing Development's study includes lists by categories of industries and number of new products as well as by individual firms. The report costs $350 from 402 Border Road, Concord, Mass. 01742.

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To Sell Products in Japan

Data 100 Forms Firm With Sumitomo

By Molly Upton
Of the CW Staff

MINNEAPOLIS – Data 100 Corp. and Sumitomo Shoji America, Inc. have jointly established Sumisho Electronics Co. Ltd., which initially will market and service Data 100 products in Japan.

Operations of the new company will be conducted by a Japanese staff, and Data 100 will sell its products to the new firm under the terms of an exclusive-distributor agreement, Data 100 said.

Under terms of the agreement with Sumitomo Shoji Kaisha, Ltd. and Japan Information Service, Ltd., Data 100 has the option to acquire up to 45% ownership of Sumisho.

Initially all financing of the new company will be assumed by Sumitomo and Japan Information Service until Data 100 establishes a significant ownership position.

The move is designed to increase the distribution of Data 100 products in Japan, which Data 100 estimates comprises about 10% of the world's total DP industry.

Sumitomo was distributor for Data 100 products from early 1972 up until about 18 months ago, when negotiations for this new arrangement began, explained Bruce Bambrough, Data 100 executive vice-president of operations.

Total value of Data 100 equipment in Japan is currently under $500,000, he estimated.

With the increased accessibility to data transmission facilities in 1974, he said, the market for Data 100 products has expanded. Since 1974 the firm has shipped about 12 very large terminals, he said.

Another factor promoting market growth is the increasing trend by Japanese firms toward centralization of DP facilities, he said.

Sumitomo expects to sell at least 35 terminals, with a retail value of $2.3 million in 1976.

Data 100 said it estimates that by the end of this decade the new company should have an installed base of nearly 500 terminal systems in Japan with an equivalent retail value of close to $30 million.

Until Data 100 assumes a significant equity position in the new company, shipments to the jointly held Sumisho will be recorded as sales, Bambrough said.

Under the terms of the agreement, for five years Data 100 can buy up to 45% of the stock at the original price, Bambrough said. After that, the stock price is based on the value of the company.

Working for Data 100 Cause

A significant factor that distinguishes this venture from a straight distributorship relationship is that the employees will be working for the Data 100 cause, he said.

In return for Sumitomo's agreement to handle lease financing, which Bambrough estimated should run about $16 million over three or four years, Sumitomo will have a chance to own up to 30,000 warrants in Data 100, which he estimated to be somewhere around 1% of the stock of the U.S. firm.

In addition to handling Data 100 terminals, the new unit will also market and service various Data 100 OEM peripherals and "other related equipment to expand the activities of the company to handle a comprehensive line of communications-related computer equipment," according to Sumitomo.

Bambrough commented this was worded "to accommodate anything we think appropriate."

First shipments to the new company have already begun, he said, adding he estimates that volume of about $20 million a year would justify assembly overseas.

Data 100 has wholly owned subsidiaries in several European countries. It started conducting business in Europe in 1970, and over one-third of the firm's business is now in Europe.

Mini Operations Centralized

MINNEAPOLIS – Data 100 Corp. is centralizing all of its minicomputer operations in Minnesota and will close its Santa Ana, Calif., plant effective Jan. 31.

The move is being made to effect economies through the use of common production, engineering and systems facilities, according to Thomas G. Herschbach, group vice-president.

Data 100 has transferred production of minicomputer processors to its central plant in Minnetonka, Minn., and minicomputer memory production to its Montevideo, Minn., plant.

The transfer affects 40 employees at the Santa Ana plant, a number of whom have been offered jobs elsewhere in the company, Herschbach said.

Data 100 has operated the California facility since 1973 when it acquired California Data Processors, a designer and licensee of minicomputers and memories.

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IBM Opposes Retelling of Whole Xerox Story in Court

By Edith Holmes
Of the CW Staff

NEW YORK – The government plans to add the Xerox story to its antitrust case against IBM, but counsel for the defense has contended only the Xerox exit from the computer industry is appropriate and necessary to detail in court.

Attorneys with the Department of Justice indicated they expect to call at least three witnesses from Xerox [CW, Jan. 12] to obtain testimony on a wide range of topics within the company's experience in the industry and related to its withdrawal last summer from the manufacture and marketing of computer systems.

The telling of the Xerox story would follow the format already established in court by witnesses from General Electric and RCA, companies which left the business in 1970 and 1971 respectively.

The Xerox witnesses anticipated thus far would provide information concerning Xerox computer revenues, costs and profits; factors affecting Xerox's decision to leave the market; profit and loss projections for the Xerox computer business and Xerox management of its computer business.

Other matters would include Xerox's commitment to its computer business; the financial implications of leasing rather than selling; market definition and Xerox's market share in relation to other companies; and barriers to entry and growth in the computer industry.

Still other topics would be Xerox's efforts to get into the business DP field; IBM market power; marketing practices and conditions; pricing practices of Xerox; the Xerox computer product line; and Xerox's acquisition of Scientific Data Systems.

Opposition by IBM

IBM counsel has agreed the Xerox exit fits the market definition portion of the government's case and belongs most appropriately at the conclusion of the witnesses scheduled to complete testimony concerning the RCA experience in computer systems sometime in February.

But lead IBM counsel Thomas D. Barr and his team have also filed papers opposing the government's addition of these witnesses on several grounds.

Barr stated in the filing he had made "a very preliminary investigation of the facts surrounding the decision of the Xerox Corp. to discontinue a major part of its electronic data processing equipment line" and concluded "a few documents – perhaps five or six . . . set forth in considerable detail the reasons why management recommended and the Xerox Board of Directors decided to take that step."

If the government adds more than the three witnesses it now expects to call, the IBM attorney predicted the trial would be lengthened by a month or more.

IBM contended the government had already conducted extensive discovery of Xerox files and personnel and had only called Max Palevsky, formerly head of Scientific Data Systems, to the stand.

IBM's filing with the court suggested the Department of Justice now seeks to use Xerox's exit as a vehicle for retelling the Xerox story in hopes of proving what it didn't show before.

"Certainly Palevsky did little to further the plantiff's case, but that is no excuse for seeking to add a new set of witnesses to try again," the IBM papers said.

Arguing the defense has a right to devote its full attention to the trial itself, the IBM memo stated, "Four months ago, when plantiff first indicated it was studying the Xerox documents, it led us to believe it was concerned only with the exit. Now we are asked to prepare for testimony as broad as the issues in the case."

The government, however, maintained it cannot restrict testimony on Xerox to the factors affecting the company's decision to leave the market.

GA Elects New Board

ANAHEIM, Calif. – A new board of directors has been elected by the stockholders of General Automation, Inc. (GA).

The board includes Lawrence A. Goshorn, chairman and president, and Burton A. Yale, secretary. Both are founders of GA.

New members are Dr. Walter F. Burke, retired director of McDonnell Douglas Astronautics; John B. Conlan Jr., a member of the U.S. House of Representatives; and Henry Ugarte, a director and financial vice-president of the Hi-Shear Corp.

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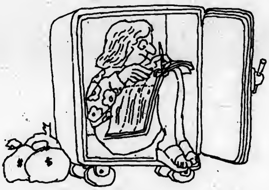
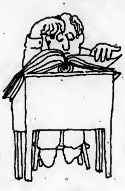


The accounts payable and receivable system.

The general accounting system.



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CW-1/12/76

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Two Firms Contacted by Singer In Attempt to Sell DP Division

By CW Staff Writers

Although the Singer Co. indicated it was contacting all firms that would possibly be interested in acquiring all or part of its Business Machines Division when it announced its intent to exit from the computer industry [CW, Jan. 12], only Burroughs Corp. and Datapoint Corp. have been approached, *Computerworld* found in a random survey recently.

Burroughs has responded to Singer's letter inquiring about its interest by indicating a willingness to discuss the matter, a spokesman said.

"It would be premature to comment at this time," he added.

Datapoint turned down Singer's inquiry because it was not interested in what Singer was offering, but a Datapoint spokesman said officials declined to describe what exactly Singer was attempting to sell.

NCR Corp. "has not had any discussions with the Singer Co. regarding acquisition of any part of its business equipment operations, and none are contemplated," an NCR spokesman said.

Honeywell Not Approached

Honeywell has not been approached, a spokesman there said. The firm couldn't comment on the prospect until it could study the matter and determine what Singer had that it might want, he added.

Honeywell will be very happy to talk with anyone about any opportunity for it to expand or improve its position in the DP area, the spokesman said.

Qantel Corp., a maker of small business systems, has also not been approached, a spokesman said.

There is a certain attractiveness to the idea of picking up Singer's System Ten base from the point of view of maintenance and similar product line, he commented.

Charles S. Adams, senior vice-president of Sweda International, said to his knowledge Singer has not approached Sweda, which he said was not necessarily interested in the whole span of Singer business.

The Singer point-of-sale user is in sort of a bind, he explained, for although Singer has indicated it will provide maintenance, the next step for the retailer is to find different equipment.

No Change In Marketing

In nearly all instances, firms said Singer's exit is not changing their marketing plans to include special emphasis on wooing the Singer customer.

However, they added, if Singer users were interested in discussing alternative equipment, they would be most willing to accommodate them.

Reaction to Singer's decision varied. Qantel does not feel it reflected on the health of the small business market, but only pointed out once again almost no firm has been successful in DP when its computer business has been subsidiary to a parent corporation.

Sweda's Adams said Singer's decision can only affect the point-of-sale marketplace negatively because it instilled fear in retailers and left them wondering who would be next.

He added it was unfortunate for those firms that have been in the marketplace for a long time and who are dedicated to the point-of-sale business.

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There are four major cities in the entire 1976 Computermarket tour. The fourth stop is London (March 23-25), the Computermarket city in which nearly half of the U K's EDP buying influences are located. As a special offer to companies considering expanding their sales in the U K in 1976, the London Computermarket show is open to new exhibitors at a cost as low as $720 for a complete exhibit package.

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The successful candidate will be a creative and self-motiveted person who welcomes challenge and has solid axperience in data processing. Background in haalth cara industry will be helpful. In addition, a good working knowledge of RPG II is essential. An extramely fina comprehansiva benefit package is offarad. Piease send rasume of education, axperience and saiary to Tha Jewish Hospital, 3200 Burnat Avenua, Cincinnati, Ohio, attantion Parsonnei Department.

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HERB RICHMAN

HOME: Beacon Hill, Boston, Massachusetts

AGE: 40

PROFESSION: Vice-President, Marketing for Data General

HOBBIES: Tennis, Photography & Horticulture

LAST BOOK READ: Alive

LAST ACCOMPLISHMENT: Directing the sale of 19,000 computers in 7 years.

QUOTE: "This is a tough competitive business. You can't just build a good product and expect it to sell itself. You need good people who can sell hard and sell smart. That's what made us a $100 million company today and that's what it's going to take to get us where we're going tomorrow."

PROFILE: Hates to lose. (And doesn't.)

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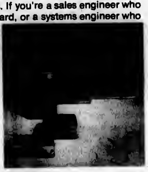

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DATA PROCESSING OPPORTUNITIES

A major Southeastern financial institution is seeking qualified candidates for the following positions in its expanding Data Processing Division. Hardware consists of dual S/370-158's under VSI and IMS.

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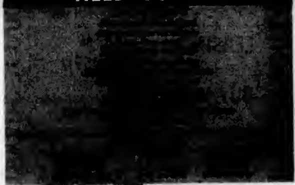

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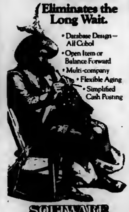

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DG Eyes Bigger Market Slice in '76

By Molly Upton
Of the CW Staff

BOSTON – Data General Corp. (DG) intends to expand its share of the growing minicomputer market in 1976, Edson D. de Castro, president, told stockholders at the firm's annual meeting last week.

These efforts will depend on the firm's ability to increase its manufacturing capability, he added.

He said 1976 "clearly appears to be a time of renewed growth and resource expansion, although the extent and duration of it is about as unclear to us as the previous year's slowdown."

DG anticipates a "very heavy pace of product announcements in 1976", one at least equal to that of 1975, when the firm introduced 15 products, he said.

During 1975 the firm felt it maintained its market share as well as operating margins of about 21%, de Castro said. With the current expansion the firm is undergoing in both facilities and personnel, he indicated there might be a slight pressure on margins until the fourth quarter of this year, along the order of 1/10 of 1%, he told the numerous analysts in attendance.

Most of DG's increase in order rates during 1975 were for the Nova 2 and 3 and Eclipse models, he said.

Demand for products "remained essentially flat during much of the year." Orders began increasing in July, mostly for larger end-user systems in the U.S.

In September, OEM orders showed renewed growth, principally in the U.S., although "we won important orders with European OEMs as well this fall," de Castro said.

"Shipments during most of the year were also flat," he said. The mix changed as the year progressed with a greater volume of larger systems such as the Nova 840 and 830 and Eclipses shipped to end users.

The average value of systems shipped during the year was $24,000 and de Castro believes this will be unchanged in 1976.

By contrast, the average system value in 1973 was about $13,000, he added.

The firm does not expect "international sales to continue at the 1975 level of total revenues due to the stronger relative demand we are experiencing in our U.S. markets," he said.

During 1975 foreign shipments resulted in $42 million in sales, up 70% over the $25 million recorded in 1974, which was partially due to a number of large shipments to European OEMs during the year, he explained.

DG expects 1976 will be one of using cash, whereas 1975 was one of generating cash, de Castro said. However, he added, there is "more than adequate cash to cover the firm's needs through this fiscal year" and probably into next year..

During 1975 DG amassed about $44 million from a $29 million equity offering, a $4.6 million industrial revenue bond in Westbrook, Maine, and positive cash flow from operations.

The firm also increased its capacity 30% and recently announced plans to expand its present plant capacity in New England 65%.

Total employment increased over 15% in the last six months.

In line with the added manufacturing capability, the firm appointed Paul D. Stein vice-president of manufacturing to succeed Henry Burkhardt, who became vice-president in charge of long-range planning.

De Castro declined to break down service and maintenance revenues, saying only they are growing at a rate consistent with DG's installed base.

De Castro also would not divulge shipment rates on a product basis.

Progress in marketing the C300 Eclipse is "reasonably successful" to the extent DG wants to penetrate that particular market, he said. Orders for the Nova 3 have been "highly encouraging."

Concerning questions on litigation between DG and Digital Computer Controls, Inc., Secretary Henry Adler remarked "the normal pace of litigation is somewhat slower than a snail."

DG Quarter Net Up

SOUTHBORO, Mass. – Data General Corp.'s (DG) earnings for the first quarter rose to $3.5 million or 37 cents a share compared with $2.8 million or 35 cents a share in the same period last year.

Part of the gain stemmed from increased "other income" amounting to $578,000, compared with $84,000 in the year-ago period.

Revenues rose to $29 million compared with $24.1 million in the same period last year.

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Earnings Reports

SYSTEMS DIMENSIONS LTD.
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.23	$.11
Revenue	5,200,000	4,800,000
Tax Cred	296,000	125,000
Earnings	604,000	252,000

STANDARD COMPUTER
Nine Months Ended Sept. 30

	1975	1974
Shr Ernd	a$.05	$.65
Revenue	4,300,000	4,496,000
Earnings	32,000	390,000

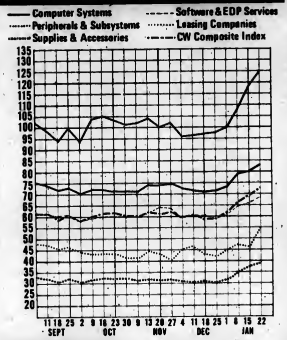
a-Adjusted for reverse stock split of 1 for 7.5 shares on May 26, 1975.

ECRM
Three Months Ended Sept. 27

	1975	1974
Revenue	$1,051,000	$1,312,000
Loss	218,000	192,000
9 Mo Rev	3,817,000	4,801,000
Loss	429,000	244,000

TERMINAL DATA
Year Ended Sept. 30

	1975	1974
Shr Ernd	$.40	.....
Revenue	4,706,040	$3,079,423
Disc Op	.....	(277,497)
Spec Cred	165,000	2,000
Earnings	282,075	(224,098)



ADAGE
Six Months Ended Sept. 30

	1975	1974
Shr Ernd	$.58	$.12
Revenue	2,956,766	2,127,368
Spec Cred	294,000	34,000
Earnings	461,095	90,793

ADVANCED SYSTEMS
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.09	$.07
Revenue	2,095,000	1,984,000
Earnings	95,000	74,000
6 Mo Shr	.15	.11
Revenue	3,915,000	3,483,000
Earnings	160,000	111,000

INTERCONTINENTAL COMPUTING
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.02	$.04
Revenue	645,848	859,794
Earnings	32,900	53,408
9 Mo Shr	.11	.06
Revenue	2,426,687	2,420,234
Earnings	143,149	102,396

MATHEMATICA
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.27	$.32
Revenue	3,868,400	3,486,500
Earnings	187,800	222,900

THE COMPUTER EXCHANGE
Three Months Ended Sept. 30

	1975	a1974
Shr Ernd	$.24	$.06
Revenue	1,122,023	965,941
Tax Cred	48,235	4,025
Earnings	196,291	50,977

a-Restated to include pro forma results of Systems Resources Corp. acquired effective July 1, 1975.

COMMUNICATIONS SATELLITE
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$1.18	$1.16
Revenue	35,116,000	34,220,000
Earnings	11,837,000	11,588,000
9 Mo Shr	3.62	3.26
Revenue	106,161,000	97,542,000
Earnings	36,157,000	32,601,000

NETWORK DATA PROCESSING
Six Months Ended Sept. 30

	1975	1974
Shr Ernd	$.14	$.09
Revenue	1,122,331	925,245
Earnings	87,273	59,996

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 21, 1976

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139.

COMPUTER SYSTEMS

EXCH		1973-76 RANGE (1)	CLOSE JAN 21 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	42-109	99 3/4	+6 7/8	+7.4
O	COMPUTER AUTOMATION	2- 14	13 1/2	+ 3/8	+2.6
N	CONTROL DATA CORP	11- 23	21 7/8	+ 7/8	+4.1
N	DATA GENERAL CORP	10- 47	43 5/8	+1 5/8	+3.8
O	DATAPOINT CORP	6- 28	26 3/4	0	0.0
O	DIGITAL COMP CONTROL	1- 4	1 1/2	- 1/4	-14.2
N	DIGITAL EQUIPMENT	46-163	161	+3 1/4	+2.0
N	ELECTRONIC ASSOC.	2- 3	2 3/4	+ 3/8	+15.7
A	ELECTRONIC ENGINEER.	5- 10	9 3/8	+ 7/8	+10.2
N	FOXBORO	23- 42	32 7/8	+ 1/4	+0.7
O	GENERAL AUTOMATION	4- 14	7 1/4	- 1/4	-3.3
O	GRI COMPUTER CORP	1- 1	3/8	0	0.0
N	HEWLETT-PACKARD CO	58-120	110	+3 1/4	+3.0
N	HONEYWELL INC	22- 43	44 3/4	+3 3/8	+13.8
N	IBM	158-253	247 1/2	+6 1/4	+2.3
O	MEMOREX	1- 10	10 1/2	+2 1/4	+27.2
O	MICRODATA CORP	2- 18	16	+4 3/8	+40.8
O	MODULAR COMPUTER SYS	5- 13	12	+1 3/4	+17.0
N	NCR	15- 33	29 5/8	+1 1/4	+4.4
O	PRIME COMPUTER INC	2- 8	6	+1 1/4	+26.3
N	PERKIN-ELMER	16- 30	24 1/4	+2 1/2	+11.4
N	RAYTHEON CO	74- 33	43 1/8	-1 3/8	-2.7
N	SINGER COMPANY	3- 17	12 7/8	+1 3/8	+11.3
N	SPERRY RAND	26- 43	43	+ 1/2	+1.1
O	SYCOR INC	5- 23	22 1/4	- 1/4	-1.1
A	SYSTEMS ENG. LABS	1- 7	6 3/4	+ 3/8	+3.8
N	VARIAN ASSOCIATES	7- 18	14	+ 3/8	+4.8
N	WANG LABS.	7- 17	13 3/4	+1 1/4	+10.6
N	XEROX CORP	47- 60	57 3/4	+ 3/8	+0.6

LEASING COMPANIES

EXCH		1973-76 RANGE (1)	CLOSE JAN 21 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 3	4 1/4	+ 7/8	+23.9
A	COMMERCE GROUP CORP	2- 4	2 3/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	3 1/4	+ 1/2	+68.8
N	DATRONIC RENTAL	1- 1	1/4	0	0.0
A	DCL INC	0- 1	3/8	+	+16.7
N	DPF INC	3- 6	5 3/8	- 1/8	-2.2
O	EDP RESOURCES	1- 2	3/4	0	0.0
A	GRANITE MGT	1- 5	4 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 3	2 3/4	0	0.0
N	ITEL	5- 9	6	+ 3/4	+10.3
N	LEASCO CORP	4- 6	6 3/8	+ 3/8	+6.0
O	LEASPAC CORP	1- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	0- 4	3/8	+ 1/4	+200.0
A	PIONEER TEX CORP	2- 7	6 3/8	- 1/4	-3.7
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	3 3/8	+ 3/8	+4.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1973-76 RANGE (1)	CLOSE JAN 21 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	1	0	0.0
A	APPLIED DATA RES.	1- 10	2	+ 1/2	+33.3
N	AUTOMATIC DATA PROC	25- 85	53 1/4	- 3/4	-1.2
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	COMPUTER DIMENSIONS	2- 8	4	+1	+33.3
O	COMP ELECTION SYSTMS	3- 7	6	- 1/4	-4.0
O	COMPUTER HORIZONS	1- 1	1/2	0	0.0
O	COMPUTER NETWORK	1- 3	2 1/8	- 1/8	-5.3
N	COMPUTER SCIENCES	2- 8	5 1/4	+ 1/2	+10.3
O	COMPUTER TASK GROUP	1- 1	3/4	0	0.0
O	COMPUTER USAGE	2- 4	3 1/4	0	0.0
O	COMSHARE	2- 4	2	- 1/4	-11.1
O	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 26	14 1/8	- 3/8	-2.3
O	INFORMATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/8	0	0.0
O	KEANE ASSOCIATES	2- 3	2 1/4	- 1/8	-5.2
O	KEYDATA CORP	2- 4	3 1/8	+ 1/4	+8.6
O	LOGICON	3- 3	4 1/4	+ 1/8	+3.0
A	MANAGEMENT DATA	1- 3	1 1/2	0	0.0
A	NATIONAL CSS INC	8- 17	16	+1	+6.6
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 17	15 1/8	+ 1/8	+0.8
N	PLANNING RESEARCH	2- 8	3 1/2	0	0.0
O	PROGRAMMING & SYS	1- 1	1/2	0	0.0
O	RAPIDATA INC	2- 3	3 5/8	+ 3/8	+11.3
O	REYNOLDS & REYNOLD	10- 24	18 3/4	+ 1/4	+1.5
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1 1/8	0	0.0
O	TYMSHARE INC	7- 23	22 3/4	+ 3/8	+2.6
A	URS SYSTEMS	2- 4	2 7/8	0	0.0
N	WYLY CORP	2- 4	2 7/8	+ 3/8	+13.0

PERIPHERALS & SUBSYSTEMS

EXCH		1973-76 RANGE (1)	CLOSE JAN 21 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 3	3 3/8	+ 3/4	+6.6
O	ADVANCED MEMORY SYS	1- 7	7 1/8	+ 1/8	+1.7
N	AMPEX CORP	3- 7	3 3/4	- 1/4	-4.1
O	ANDERSON JACOBSON	1- 3	2 3/8	+ 3/8	+18.7
O	BFENIVE MEDICAL ELEC	1- 5	3 3/8	+ 1/8	+3.5
A	BOLT,BERANEK & NEW	5- 13	8 7/8	- 1/8	-1.7
N	BUNKER-RAMO	4- 6	3	+ 1/8	+2.5
A	CALCOMP	3- 7	4 1/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 3	2 1/8	+ 3/8	+21.4
N	CENTRONICS DATA COMP	7- 25	23 1/4	+1 3/8	+6.2
O	CODEX CORP	15- 36	24	+1 3/4	+7.6
O	COGNITRONICS	1- 2	1	0	0.0
O	COMPUTER COMMUN.	1- 2	1 3/8	+ 1/4	+22.2
O	COMPUTER CONSOLES	3- 7	4 3/8	- 1/8	-2.6
A	COMPUTER EQUIPMENT	1- 2	1 1/2	+ 1/8	+9.0
O	COMPUTER MACHINERY	1- 2	3 3/8	+ 1/4	+22.2
O	COMPUTER TRANSCEIVER	1- 2	3/4	0	0.0
O	CONTEN	2- 5	8 7/8	- 1/4	-6.0
N	CONRAC CORP	12- 30	23 1/4	0	0.0
O	DATA ACCESS SYSTEMS	1- 3	1 3/4	0	0.0
O	DATA 100	5- 18	7 7/8	+ 1/4	+3.2
A	DATA PRODUCTS CORP	2- 6	6	+ 3/8	+6.6
O	DATA TECHNOLOGY	1- 3	1 3/4	+ 1/4	+18.6
O	DATUM INC	1- 2	1 1/4	+ 1/8	+11.1
O	DECISION DATA COMPUT	2- 7	3 1/4	- 3/8	-10.3
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DI/AN CONTROLS	1- 1	1/2	0	0.0
N	ELECTRONIC M & M	1- 3	1 3/4	+ 1/4	+10.6
O	FABRI-TEK	1- 1	3/4	+ 1/8	+20.0
O	GENERAL COMPUTER SYS	1- 2	2	0	0.0
N	HAZELTINE CORP	3- 8	4 7/8	+ 1/8	+2.8
N	HARRIS CORP	16- 38	36	0	0.0
A	INCOTERM CORP	3- 12	10 5/8	+1 1/4	+13.3
O	INFOREX INC	2- 3	3 1/4	- 1/4	-7.1
O	INFORMATION INTL INC	8- 14	10 7/8	+ 1/4	+2.3
A	LUNDY ELECTRONICS	3- 7	6 3/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1	+ 1/4	+33.3
A	MILGO ELECTRONICS	8- 24	16 1/4	+ 5/8	+3.3
N	MOHAWK DATA SCI	1- 3	3 1/8	- 1/4	-7.4
O	OPTICAL SCANNING	1- 3	1 3/4	+ 1/4	+16.8
O	PENRIL CORP	1- 2	1 1/2	0	0.0
O	PERTEC CORP	2- 6	3 1/4	+1 1/4	+31.2
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	3/8	0	0.0
O	QUANTOR CORP	2- 6	4 3/4	0	0.0
O	RECOGNITION EQUIP	2- 9	7 1/8	+1 1/8	+16.7
N	SANDERS ASSOCIATES	3- 11	6 3/8	- 3/4	-10.5
O	SCAN DATA	1- 3	2 3/4	0	0.0
O	STORAGE TECHNOLOGY	8- 17	11	+ 1/8	+1.1
O	T BAR INC	3- 8	3 7/8	+ 1/8	+2.1
O	TALLY CORP.	1- 5	3 3/4	- 1/4	-6.2
O	TEC INC	1- 4	5	+ 1/2	+20.0
N	TEKTRONIX INC	16- 31	30 3/4	+ 7/8	+1.7
N	TELEX	1- 3	2 3/8	- 1/8	-3.0
O	WANGCO INC	4- 12	12 3/8	+ 7/8	+7.8
O	WILTEK INC	1- 4	1 1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1973-76 RANGE (1)	CLOSE JAN 21 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 3	4 1/2	0	0.0
A	BARRY WRIGHT	5- 7	6 1/4	+ 1/4	+4.1
O	CYBERNATICS INC	0- 1	3/8	0	0.0
A	DATA DOCUMENTS	29- 42	36 3/8	+3 3/8	+10.2
O	DUPLEX PRODUCTS INC	12- 23	16 3/4	-1 1/4	-6.2
N	ENNIS BUS. FORMS	3- 7	8	+ 1/8	+2.1
O	GRAHAM MAGNETICS	5- 10	9 3/4	+1 1/4	+14.7
O	GRAPHIC CONTROLS	8- 21	13 1/2	+ 3/4	+5.0
N	3M COMPANY	43- 66	60	- 1/8	-0.2
O	MOORE CORP LTD	39- 31	30 1/2	+1 1/4	+2.5
N	NASHUA CORP	9- 22	11 3/8	- 1/2	-4.2
O	STANDARD REGISTER	11- 20	16 1/2	+ 3/4	+4.7
O	TAB PRODUCTS CO	4- 8	3 1/2	- 1/2	-8.8
N	UARCO	17- 24	23 1/8	+2 1/8	+10.1
O	VANIER GRAPHICS CORP	4- 7	5 1/4	0	0.0
A	WABASH MAGNETICS	8- 3	4 7/8	+ 1/8	+2.6
N	WALLACE BUS FORMS	15- 25	20 3/8	+1	+5.0

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